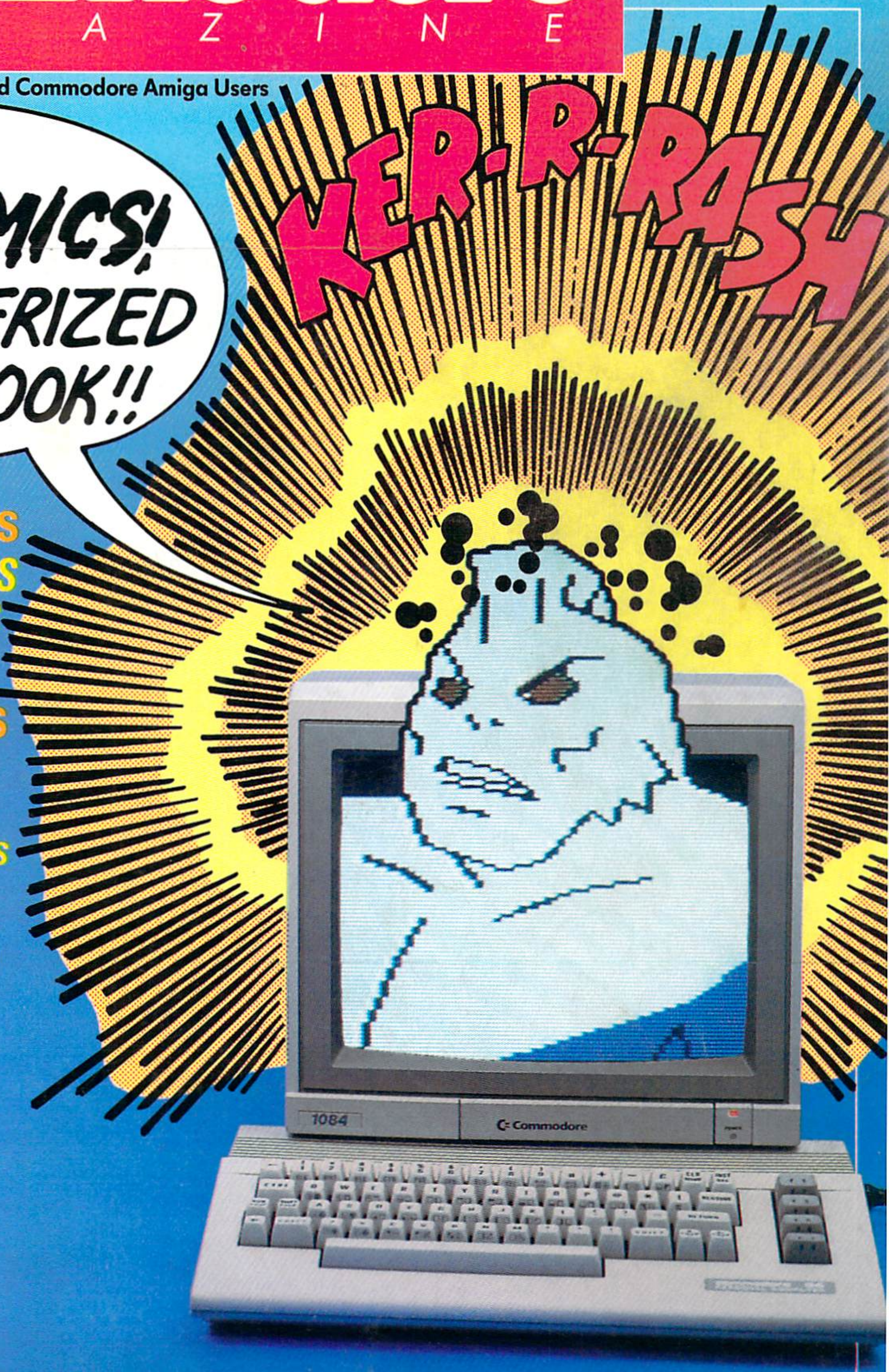
Joystick/Mouse Troubleshooting

Commodore MAGAZINE

September 1988
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The Magazine for Commodore and Commodore Amiga Users



Software Reviews

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64 & 128 4TH & INCHES

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for the 64 and 128

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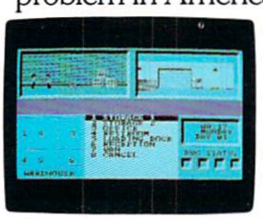
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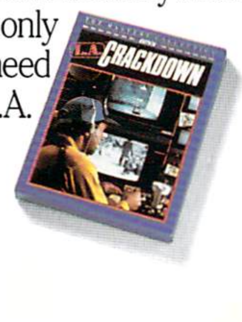
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ENTERTAINMENT
- Forest Raiders — High Speed Danger*
- Road Block — Action Strategy*
- Bert The Bug — Family Fun

UTILITIES & TOOLS
- Track & Sector Spreadsheet — DOS Utility*
- Screens to Basic — Captures Screen to Print Statements*
- Nice Lister — Format Printouts Control Codes*
- Function Key — Gives C64, C128 F-Keys*

EDUCATION
- Typing Tutor — Learn to Touch Type (includes game)
- 3D Plot — Create 3D Shapes Using Formula

BUSINESS/HOME
- Appointment Manager — Diary/Calender†
- Little Invoicer — Business Invoicing†

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Commodore MAGAZINE

SEPTEMBER 1988, *Volume 9, Number 9*



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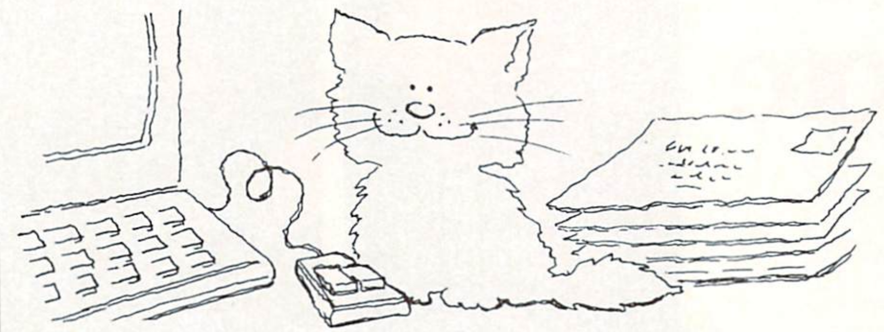
FEATURES

COVER STORY

COVER PHOTO: *Charles Bartholomew*
Graphics: *Gwenn Knapp*
Software: *Gamma Force in Pit of a Thousand Screams* by Infocomics

REVIEWS

DEPARTMENTS



To the Editor:

I am in the middle stages of publishing a 128 users guide to public domain, freeware and shareware programs. I am in the belief that this is a fine computer, and I would like to see it around a few more years.

In need to hear from more 128 authors to get their software out to all interested users. I have reviewed over 200 fine 128 programs for the book, but I am lacking in a few areas. I know your magazine is always cramped for space, but this help will not only benefit me, but all 128 users.

Here's what our book has:

Reviews on all aspects of 128 software (no commercial), BBS, word processors, terminals, databases, games, utilities, business software and much more. Also we will have articles from the public domain writers, info on their latest products and updates on their most current versions. We will supply addresses to all public domain services that wish to be in our book (at no charge). We will also be talking about hardware upgrades.

Brad S. Burean
Blynd Dog Publishing
9410 E. 18th Terrace
Independence, MO 64052

Editor's Response: *Okay, 128 authors, let Brad know about your public domain or shareware programs at the address listed.*

To the Editor:

I've been a subscriber to Commodore for almost two years and I have enjoyed each issue. However, a few months ago I upgraded to an Amiga 500 and decided to drop my subscription in favor of *AmigaWorld.* But you've been expanding coverage of the Amiga so much that I again look forward to receiving *Commodore*, so I am resubscribing. And I'll keep my Commodore 64 which still does a lot of good things.

Sincerely,
Charles M. Lowe
Port St. Lucie, FL

Editor's Response: *Thanks for the compliments. We'll continue to cover the Commodore computers that our readers are most interested in.*

To the Editor:

I have heard rumors that the Commodore 128 computer has been discontinued. If this is true, why? Also, if this is true, why have I not heard anything in your magazine? Thank you for your time.

Sincerely,
Sean M. Burke
Burton, OH

Editor's Response: *The original Commodore 128 personal computer is no longer in production. However, the Commodore 128D (with build-in 1571 disk drive) is still being manufactured and sold worldwide. Since most Commodore 128 owners also purchased a 1571 disk drive as part of their system, this was a logical move to streamline the product and offer the customer a better price.*



Address letters for publication to:
Letters Editor, *Commodore Magazine*,
1200 Wilson Drive, West Chester, PA 19380.

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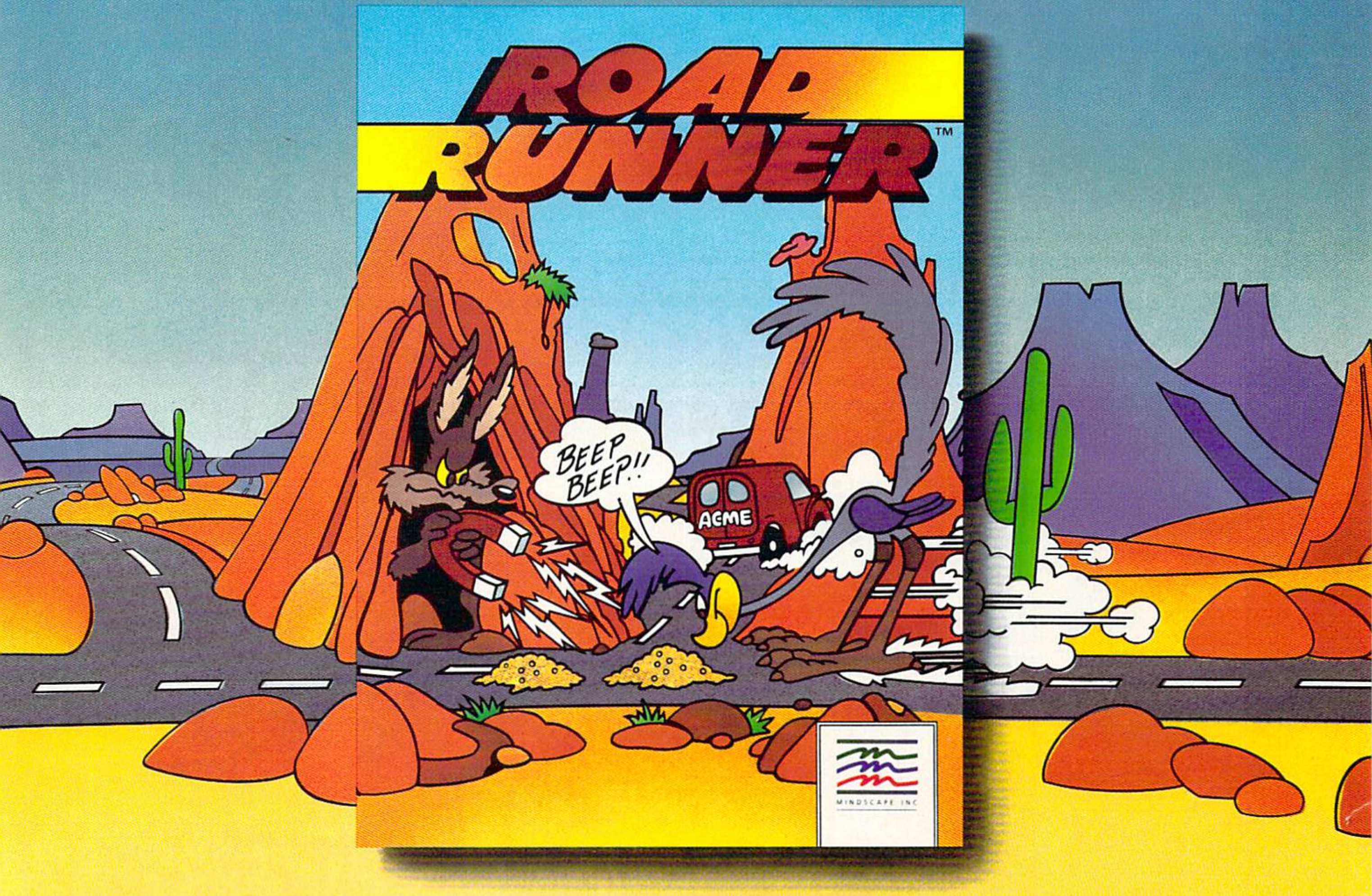
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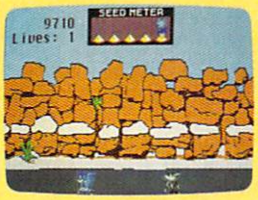
Commodore Magazine, Volume 9, Number 9, September 1988.

Commodore Magazine is published monthly by Commodore Magazine Inc., 1200 Wilson Drive, West Chester, PA 19380. U.S.A. U.S. subscriber rate is $35.40 per year; Canadian subscriber rate is $45.40 per year; Overseas subscriber rate is $65.00 per year. Questions concerning subscription should be directed to Commodore Magazine Subscription Department, Box 651, Holmes, Pennsylvania 19043. Phone (800) 345-8112. In Pennsylvania (800) 662-2444.
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This little birdie goes beep beep.



GET GOING OR GET PLUCKED!



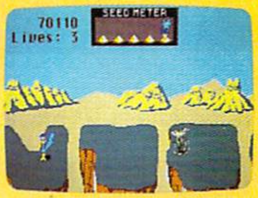
How fast can you make Road Runner run? It better be very fast because that hungry Wile E. Coyote will catch him sure as sunrise!



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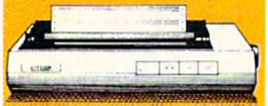
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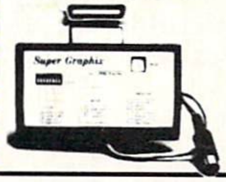
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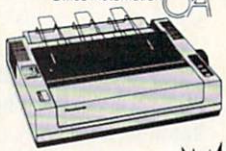
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CONSUMER ELECTRONICS SHOW

The Consumer Electronics Show, held June 4-7 in Chicago, was the site of several new Commodore and Amiga software announcements:

Accolade introduced four new sports simulations for the Commodore 64. **Fast Break**, a three-on-three basketball game for one or two players, incorporates the interface that made *Hardball* and *4th & Inches* so easy-to-use. **Serve & Volley** is a one- or two-player action/strategy tennis simulation with three levels of difficulty for the Commodore 64. The game emphasizes correct ball placement, stroke selection and timing. **Rack 'Em** simulates five different billiards games for one or two players. **Rack 'Em** includes bumper pool, straight pool, snooker, 8-ball and 9-ball rules. **T.K.O.** is an arcade-style boxing game for the Commodore 64 which incorporates a split screen and large graphics. Each game carries a suggested retail price of $29.95. Accolade, 550 S. Winchester Blvd., Suite 200, San Jose, CA 95128. (408) 985-1700.

Berkeley Softworks unveiled **GEOS 2.0** for the Commodore 64. **GEOS 2.0** offers increased speed and versatility and is bundled with popular GEOS-based programs: *geoPaint, geoWrite 2.1, geoSpell, geoMerge, Paint Drivers* (for enhancing documents with graphics), *Text Grabber* (for importing text from other word processors), and *geoLaser* (for printing GEOS documents on a laser printer). **GEOS 2.0** retails for $59.95. Berkeley Softworks, 2150 Shattuck Ave., Berkeley, CA 94704. (415) 644-0883.

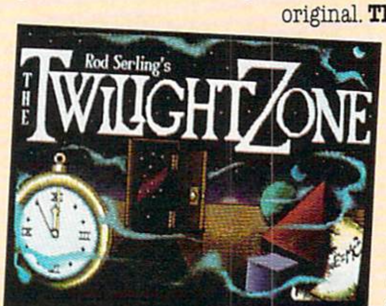
Epyx announced several new products for both the Commodore 64 and Amiga: **Street Sports Football** features that loveable gang of neighborhood rowdies tossing the pigskin around puddles and parked cars. **Final Assault** is a mountain-climbing simulation that challenges you to scale six different trails with three levels of difficulty. **Battleship** is the classic strategy contest with full-color graphics and combat sound effects.

A new line of strategy/action games for the Commodore 64 and Amiga called **U.S. Gold** was also announced by Epyx. Introductory titles include: **Dive Bomber,** a WWII flight combat game; **Tower Toppler,** a 3D maze in outer space game; **Sports-A-Roni,** a zany Italian sports competition; **Street Cat,** a series of urban feline athletic contests; and **Metrocross,** a subway obstacle course (Commodore 64 only). Epyx, Inc., 600 Galveston Dr., Redwood City, CA 94063. (415) 366-0606.

MicroIllusions announced a licensing agreement with Hanna-Barbera Productions, whose animated series include **The Flintstones, The Jetsons, Scooby-Doo** and **Johnny Quest.** Amiga and Commodore 64 arcade and/or adventure versions of these popular animations are slated for release late this year. A partnership between MicroIllusions and American Liquid Light (peripheral manufacturer) was also announced at CES. The two companies will be collaborating on a new line of graphics hardware for the Amiga 2000. New Amiga titles released by MicroIllusions include: **Turbo** ($24.95), **Craps Academy** ($39.95), **Music- X** ($229.95), and **Tracers** ($34.95). MicroIllusions, 17408 Chatsworth St., Granada Hills, CA 91344. (818) 360-3715 or (800) 522-2041.

Mediagenic released two new Commodore 64 titles in its Activision line: **U.S.S. Ocean Ranger** and **Predator**. **U.S.S. Ocean Ranger** is a missile ship simulation that takes you to the Bering Sea, Southeast Asia, Central America and the Persian Gulf. The program carries a suggested retail price of $34.95. In **Predator** you take on Arnold Schwarzenegger's movie role as leader of an elite rescue mission. Your unit is destroyed, and you find yourself alone against the **Predator. Predator** retails for $29.95. Mediagenic, 3885 Bohannon Dr., Menlo Park, CA 94025-1001. (415) 329-0260.

First Row Software Publishing announced new games based on two popular television series: **The Honeymooners** and **The Twilight Zone.** First Row promoted the announcement by featuring the actual Honeymooners set (borrowed from the Gleason estate) in their booth. **The Honeymooners** is an interactive role-playing game for the Amiga and retails for $39.95. **The Twilight Zone** incorporates the bizarre storyline and "twist" endings of the original. **The Twilight Zone** is available for the Amiga at a suggested retail price of $39.95 and will also be shipping for the Commodore 64 in November for $39.95. First Row Software, 900 E. Eighth Ave., King of Prussia, PA 19406. (215) 337-1500.



Rainbird Software introduced several new titles at CES. **Stargl ider II**, a strategy/adventure game for the Amiga, combines the reality of a flight simulator with the action of an arcade game. You attempt to defend against alien invasion using an Airborne Ground Attack Vehicle on the planet Novenia. Suggested retail price is $39.95. Rainbird also announced the release of **The Universal Military Simulator** for the Amiga. The program features five preprogrammed battles: Gettysburg, Arbella, Hastings, Marston Moor and Waterloo, however, any historical land battle can be recreated. **UMS** retails for $49.95. (A Commodore 64 version will also be released in the fourth quarter.) **Carrier Command** is a strategic action game for the Amiga and Commodore 64 that takes place in the year 2166. While searching for precious fossil fuels an allied carrier has fallen into enemy hands, and you must attempt to regain command. **Carrier Command** for the Amiga retails for $44.95, the Commodore 64 version for $34.95. Rainbird Software, 3885 Bohannon Dr., Menlo Park, CA 94025. (415) 322-0412.

Interplay Productions announced an Amiga title and a Commodore 64 title at CES. **Neuromancer** for the Commodore 64 is based on the science-fiction novel by William Gibson. The program retails for $39.95. **Battle Chess** for the Amiga adds 3D animation and sound to the game of kings. **Battle Chess** has a suggested retail price of $49.95. Interplay Productions, 1550 N. Bristol, Suite B., Newport Beach, CA 92660. (714) 476-8686.

Strategic Simulations, Inc. announced availability dates for two releases in their Advanced Dungeons & Dragons line. **Pool of Radiance** is a fantasy role-playing adventure with multiple characters and 3D graphics for the Commodore 64. In **Heroes of the Lance** the player controls the eight "Heroes of the Lance" characters via joystick. **The Dungeon Masters Assistant—Volume I, Encounters** is an AD&D utility program for traditional AD&D table top players and will be available for the Commodore 64 in the fall. Strategic Simulations, Inc., 1046 N. Rengstorff Ave., Mountain View, CA 94043. (415) 964-1353.

Paragon Software introduced **Twilight's Ransom,** an urban

Continued on page 10


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"RUFF! RUFF!"
Producers ROBERT & PHYLLIS JACOB
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THE THREE STOOGES
CURLY
MOE
Actual Amiga Screens

Continued from page 8

adventure story in which you find you have only 12 hours to rescue your girlfriend Maria from her captors. Both Commodore 64 and Amiga versions will be available. Paragon Software Corp., 600 Rugh St., Greensburg, PA 15601. (412) 838-1166.

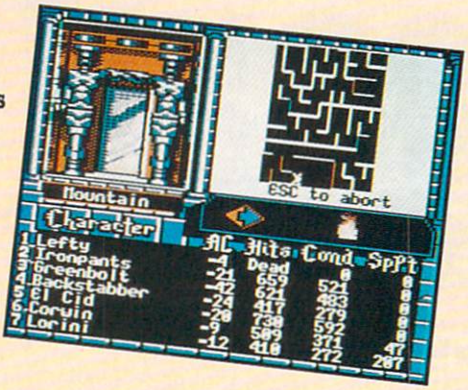
Murder on the Atlantic is Intracorp's latest release for the Commodore 64 (34.95) and Amiga ($39.95). Go back to 1938 and solve the murder mystery on the S.S. Bourgogne, and you could win the grand prize of $10,000 in Intracorp's **Murder on the Atlantic** contest. Intracorp, Inc., 14160 SW 139th Ct., Miami, FL 33186. (800) 468-7226 or (305) 758-0054.

Broderbund introduced **Downhill Challenge** a 3D interactive ski-racing simulation for the Commodore 64. The program lets users choose downhill, slalom, giant slalom and jumping in beginner, intermediate or advanced mode. **Downhill Challenge** will retail for $24.95. Broderbund Software, Inc., 17 Paul Dr., San Rafael, CA 94903-2101. (415) 492-3200.

Bard's Tale III: Thief of Fate

Bard's Tale III: Thief of Fate is Electronic Arts' latest offering in their medieval fantasy series set in the fabled Skara Brae. In this installment for the Commodore 64, the town has been left in ruins. Seems the Mad God Tarjan has sought revenge for your victory in *Bard's Tale II,* and vows that destroying Skara Brae is only the beginning. You must form a group of worthy adventurers to find and stop Tarjan before he can run amok. The game incorporates over 100 magic spells and 500 monsters (some of whom can join your party).

Your party (which can now include female characters) will travel through 84 dungeon levels and seven different dimensions on your quest. **Bard's Tale III: Thief of Fate** retails for $39.95. For further details contact: Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. Phone: (415) 571-7171.



Captain Blood

Fractal and vector graphics are incorporated in Mindscape's latest release **Captain Blood.** Your assignment is a stellar search-and-destroy mission; your target: a handful of Captain Blood clones who are sapping our hero's energy and prohibiting his propagation. **Captain Blood** for the Commodore 64 retails for $34.95, the Amiga version for $49.95. For more information contact: Mindscape, Inc., 3444 Dundee Rd., Northbrook, IL 60062. Phone: (312) 480-7667.

Western European Tour

SubLOGIC has released a **Western European Tour** scenery disk for use with all SubLOGIC flight simulators *(Flight Simulator II, Jet,* and *Stealth Mission).* The disk includes large areas of Great Britain, France and West Germany. You can also wander into Russian territory and land in Red Square. **Western European Tour** is available for the Commodore 64 and the Amiga for a suggested retail price of $24.95. For further information contact: SubLOGIC Corporation, 501 Kenyon Rd., Champaign, IL 61820. Phone: (217) 359-8482. To order call: (800) 637-4983.

Wasteland

Electronic Arts' Commodore 64 version of **Wasteland** challenges you to survive the post-nuclear, radioactive deserts of the southwest U.S. in the year 2087. You assemble a party of seven to assist in your strategic missions: freeing the hostages, purifying the water supply, determining which of the characters you meet to befriend and which to destroy. **Wasteland** promises over 100 hours of play and retails for $39.95. For details contact: Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. Or call: (415) 571-7171.



Zak McKracken and the Alien Mindbenders

Lucasfilm Games has released **Zak McKracken and the Alien Mindbenders,** a "comedy/thriller" game for the Commodore 64. The title character is a yellow journalist for the tabloid *National Inquisitor.* Zak discovers that a "worldwide stupidity epidemic" is being foisted on an unsuspecting earth. Zak and his pals must find and unmask the alien saboteurs before their stupidity machine can complete its dirty deed. **Zak,** et al. retails for $34.95. For further information contact: Lucasfilm Games, P.O. Box 2009, San Rafael, CA 94912. Or call: (415) 662-2460.

Graphic Booster 128

Combo Ltd. has announced a new high-res display for the Commodore 128. Resolutions of up to 720 × 700 pixels in interlace mode are attainable on monochrome monitors. For color monitors, 640 × 420, 720 × 420, 752 × 420, 640 × 546 and 752 × 546 pixel resolutions are available using **Graphic Booster 128.** For EGA monitors you can get 752 × 600, 720 × 600, 640 × 600 pixel resolutions.

The **Graphic Booster 128** works with the 128D or a 128 with a 64K VDC RAM chip. For unmodified 128s, there is the **Graphic Booster 128** hardware expansion which plugs in, (no soldering) to expand your VDC RAM to 64K. Suggested retail price for **Graphic Booster 128** is $69; the **64K VDC RAM Expansion** sells for $49. For further information contact: Combo Ltd., P.O. Box 2560, Branchville, NJ 07826.

Continued on page 12



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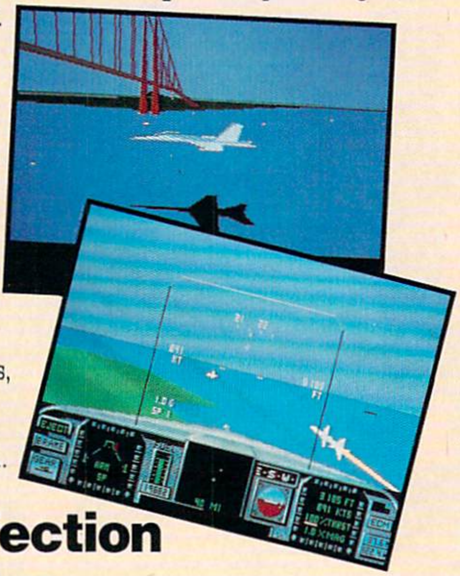
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Continued from page 10

F/A-18 Interceptor

Electronic Arts has introduced **F/A-18 Interceptor**, a military flight simulator for the Amiga. The program includes six combat missions, a training mission and a free flight option and is set in the San Francisco Bay area. **F/A-18 Interceptor** incorporates digitized sound and 3D graphics. To further add to the realism, during free flight you can try to fly under the Golden Gate Bridge, buzz Alcatraz and land at the San Francisco Airport. The program carries a suggested retail price of $49.95. For more information contact: Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404. Phone: (415) 571-7171.



Virus Infection Protection

Amiga users who are concerned about destructive viruses infecting their systems should check out **Virus Infection Protection** (**V.I.P.**) from Discovery Software. According to Discovery's president, Rick Ross, "**V.I.P.** works like a vaccination to safeguard a user's entire library before a virus hits."

V.I.P. is has a multitasking interface, is compatible with all Amiga models and will operate in six different languages: English, German, Danish, French, Italian and Spanish. The program is available at a suggested retail price of $49.95. For details call Discovery Software at (800) 34-AMIGA (342-6442).

ProScript

New Horizons Software is providing PostScript compatibility for their Amiga word processor *ProWrite* with their latest release **ProScript. ProScript** will translate *ProWrite* files so that they can be sent to a PostScript-compatible printer or saved to be printed later. The program includes options to reduce or enlarge the printout, control the number of gray shades, select paper size and print only odd- or even-numbered pages. **ProScript** retails for $49.95. For more details contact: New Horizons Software, Inc., P.O. Box 43167, Austin, TX 78745. Phone: (512) 328-6650.

Imagine Music to Distribute A500

Commodore Business Machines has announced a distribution agreement with the Imagine Music Group, a leading distributor of computer music products for the music and recording industry. Imagine will distribute the Amiga 500 through its 1000 music outlets nationwide. "The Amiga 500 is the only computer in its price range to offer true multitasking applications to the musician," said Rich McIntyre, Commodore senior vice president. "Now, with the Imagine agreement, musicians can purchase this computer along with other music equipment from a trained industry specialist in a familiar environment."

Amiga Critic's Choice

Three Amiga software developers are cooperating to bring Amiga users **The Critic's Choice** productivity bundle. The package is comprised of **KindWords** (word processor from the Disc Company), **MaxiPlan** (spreadsheet from Oxxi, Inc.) and **Microfiche Filer** (graphics-capable database from Software Visions). **The Critic's Choice** is offered at a retail price of $249.95 (a savings of $100 over the individual units' retail costs) at Commodore Amiga dealers. (For the name of a Commodore Amiga dealer in your area call (800) 343-3000.) The special offer will be in effect through September 30, 1988. For further details contact: The Disc Company, 3135 South State St., Ann Arbor, MI 48108. Or call: (313) 665-5540.

Investor's Advantage 2.0

Software Advantage Consulting has released **Investor's Advantage 2.0** for the Amiga. The program is an investment analysis tool for the individual investor. **Investor's Advantage** comes with a program disk, starter data disk and reference manual and allows investors to save up to 229 weeks of history on as many as 500 stocks. The program is available for $99.95 from: Software Advantage Consulting Corporation, 37346 Charter Oaks Blvd., Mt. Clemens, MI 48043. Phone: (313) 463-4995.

CSA Amiga Releases

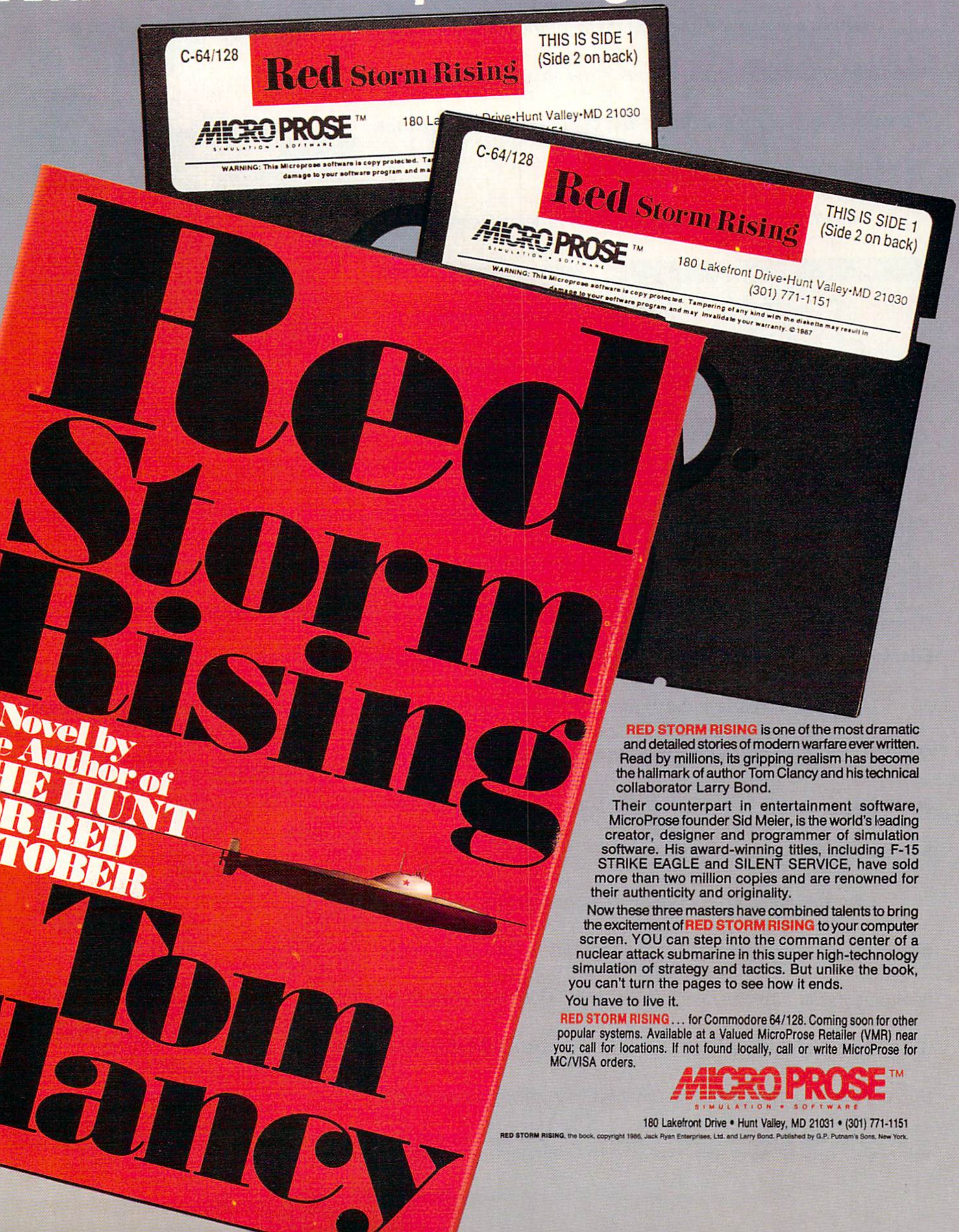
Computer Systems Associates' new **ND-500** board features Motorola's latest 16 MHz 68000 processor as well as a socket for an optional 68881 or 68882 running at up to 25 MHz. CSA attributes the increased speed to its FastPac technology consisting of Kickstart 1.2.2 in a very fast ROM, which allows most standard Amiga software to run faster by increasing the operating system speed of the Amiga. CSA reports that the new **ND-500** will also upgrade the Amiga 1000 as well. For systems using external expansion products that may tax the A500 power supply, there is a version of the **ND-500** (the **ND-500L**) that employs Motorola's new low-power 16 MHz 68HC000. The **ND-500** retails for $495.

CSA's **FastPac** features Amiga Kickstart 1.2.2 in fast EPROM on CSA's 32-bit Static RAM board. When used in combination with a 68020 or 68030 CPU board, CSA's **FastPac** is the fastest accelerator combination available for the Amiga. Amiga's 7 MHz OS frequency can be increased to 14 MHz with only a small amount of 32-bit RAM for a sizeable performance increase for most applications.

FastPac is available in a variety of configurations, including a $295 upgrade for current owners of CSA products, a $2495 **FastPac** System consisting of CSA's CPU board in combination with a FastPac SRAM board, and various RAM/ROM combinations up to 1.75MB.

For more information contact: Computer Systems Associates, 7564 Trade St., San Diego, CA 92121. Phone: (619) 566-3911.

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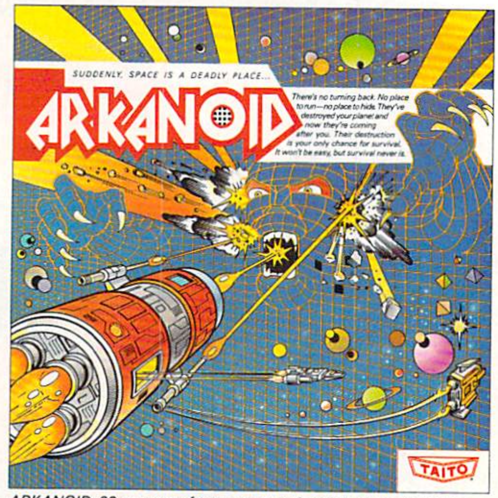
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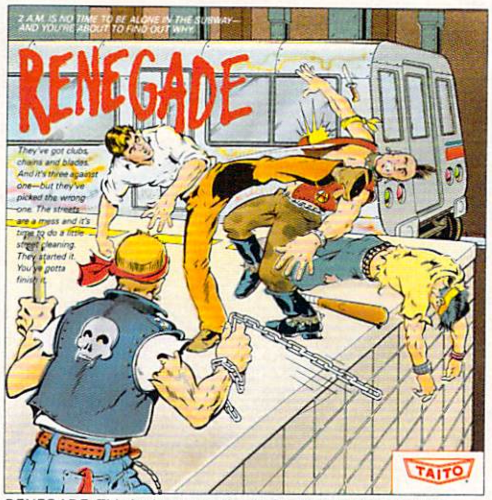
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Our strength comes from the massive development effort we put into creating the kind of games that satisfy the ever-growing arcade appetite and the research gathered from the more than 100,000 arcade machines Taito operates in Japan. (The money in the coin boxes at the end of the day tells you quickly if you've got



ALCON: The ultimate in inter-planetary combat. Battle aliens with lasers, homing missiles, bombs and shields. Fantastic vertical scrolling future-world landscapes.

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Lou Sander's Tips & Tricks

Compiled by Louis F. Sander

This month we feature some excellent utilities for the 64, as well as yours truly's ever-popular tips on increasing your computer knowledge. As always, there's something here for you, regardless of your level of knowledge, skill and interest. Send your own tips and tricks, one per sheet of paper, each sheet including your name and return address, to:

Louis F. Sander
P.O. Box 101011
Pittsburgh, PA 15237

If we accept your idea for publication, you'll get worldwide fame, the undying gratitude of thousands of readers, and a check for at least ten bucks.

128 Screentron: Here's a *most* unusual screen drawing program for the 128.

A joystick plugged into Port 2 controls the tiny dot in the upper left-hand corner of the screen. As you move the stick in various directions, a simulated three-dimensional "thing" will be drawn sloping downward to the right. Pressing the fire button erases everything and returns the dot to its home position.

Experiment with different directions on your joystick, and you'll see some unusual patterns develop.

Disable the program by simultaneously pressing STOP and RESTORE.

Peter Belovsky
New York, NY

```
100 REM 128 SCREENTRON - PETER
    BELOVSKY
110 :
120 REM USE JOYSTICK IN PORT 2
130 :
140 X=5:Y=5
150 GRAPHIC 1,1
160 COLOR 0,2:COLOR 4,16:COLOR 1,1
170 DRAW 1,X,Y TO Y,X
180 J=JOY(2):IF J=>128 THEN 140
190 IF J=1 OR J=2 OR J=8 THEN Y=Y-1
200 IF J=6 OR J=5 OR J=4 THEN Y=Y+1
210 IF J=8 OR J=7 OR J=6 THEN X=X-1
220 IF J=2 OR J=3 OR J=4 THEN X=X+1
230 IF Y<5 THEN Y=5
240 IF X<5 THEN X=5
250 GOTO 170
```

Finding computer bargains: This is a good season to pick up that printer, disk drive or monitor that you haven't been able to afford. In late summer and early fall, many amateur radio clubs hold "hamfests," where radio and other equipment is sold in a flea market atmosphere. Luckily for us, most computerized hams use Commodore equipment, so their hamfests can be very good hunting grounds.

At a West Virginia hamfest last year, I saw an SX64 for $200, several 64s for under $100, a 1541 for $85, and a nice monochrome monitor for $35. I also saw several semi-commercial vendors with good prices on disks, envelopes and the like.

Believe it or not, another excellent source of bargain equipment is the non-Commodore computer store. If they have any Commodore-compatible equipment, they probably don't even know how to hook it up. Since your potential treasure is useless to them, they'll probably price it accordingly.

At a recent "warehouse sale" of shopworn and trade-in equipment, run by an IBM-oriented dealer, I saw *three* Commodore-compatible printers for $25 each! Since they had the serial bus DIN plug and no Centronics-type connector, nobody in the store knew what to do with them.

The same store had used monochrome monitors for $25 and $35 and several pieces of Commodore software for $2 each!

W3BOA
Pittsburgh, PA

Become a hardware hacker: In *Commodore Magazine* and elsewhere, you'll sometimes find articles about build-it-yourself accessories for the User Port. These little gadgets let your computer control lights and switches, and/or sense information from the outside world.

Don't be afraid to try these amazing projects—completing one is one of computerdom's biggest thrills! I very well remember my PET User Port projects of 1980-1981. After building the first ones, I figured out how to design them. Along the way, I mastered some of the most important pieces of microcomputer knowledge and got my start as a Commodore "expert."

Electronics construction is a fascinating field, and with today's components it's easy to build a project that works. The parts for most projects can be bought at your local Radio Shack, and the skills for assembling them are not very hard to acquire. If you can use a screwdriver, you can learn to use wire strippers and needle-nose pliers. Learning to solder is a little more difficult, but anyone can become proficient with an hour or so of practice.

Continued on page 99

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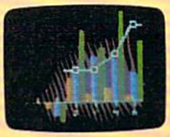
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- **Down, Down, Down** Can you survive six levels of acid mines?
- **Robot Rescue** As Mandar II, rescue our ambassadors from the Vordax.
- **Notepad** Two text screens for notes.
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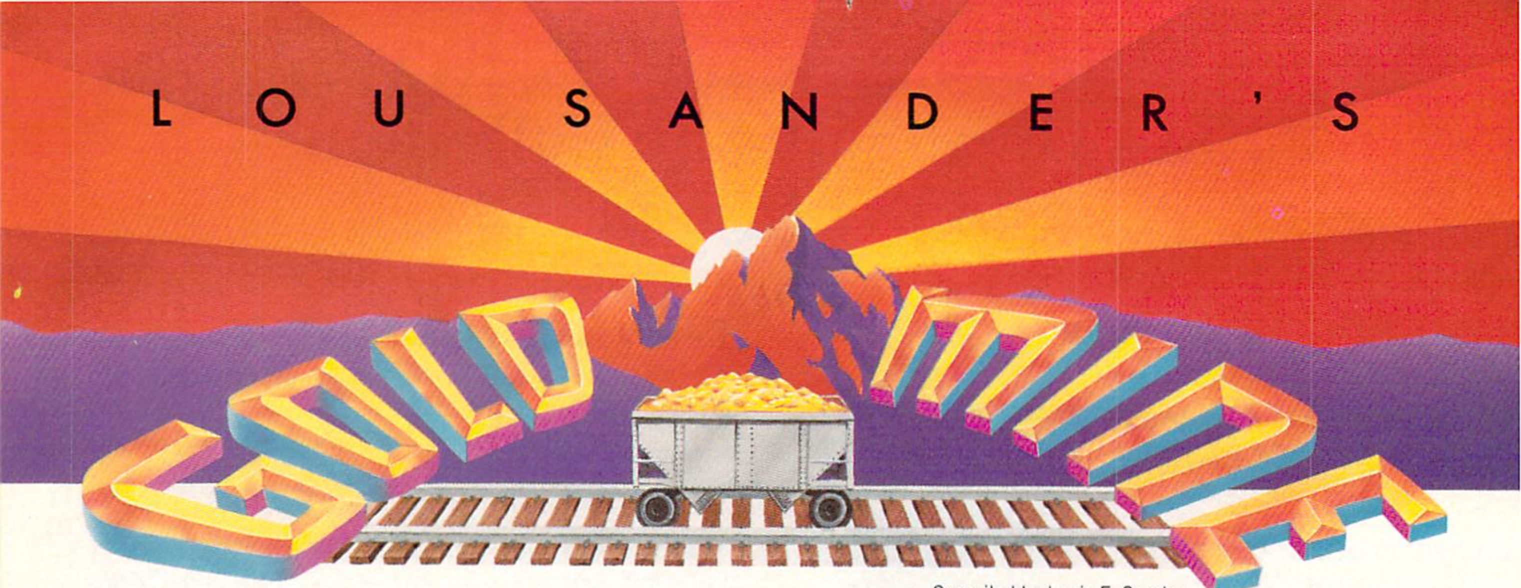
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Compiled by Louis F. Sander

This month's nuggets include tips for some of 1988's most popular Commodore and Amiga games. Needless to say, many of them will work with the Atari, Apple or IBM versions of the software. So no matter what the computer, it's certain that Gold Mine Rules!

Each of your Gold Mine submissions should combine all the tips for one game. If you put your name and address on every sheet, we'll know where to mail your $5. Send all contributions to:

The Gold Mine
P.O. Box 101011
Pittsburgh, PA 15237

Airborne Ranger: On a mission requiring secrecy, don't try to cause a diversion with LAW rockets or time bombs. Doing so will attract guards and will cost you 500 merit points for prematurely alerting them.

In desert or temperate areas, you can easily hide under water by getting into the crawl position and entering the water. Press the space bar to come up for air.
Scott Fierro
Address Unknown

Airborne Ranger: If you get killed and lose a ranger that you'd rather keep, wait until the computer prompts you to insert your ranger disk. Then leave the program disk in the drive and press the button. Select "cancel," and your valuable man will be saved.
Joel Steudler
Pittsburgh, PA

Airborne Ranger: Bunkers and machine gun posts have blind spots. Approach them from the side. The upper left and right corners seem to be the safest.
Lance Gater
Address Unknown

Alternate Reality: the City: If your best character dies and you don't have a backup character disk, don't worry. Load the game back up and when the main menu appears, press "E" to resume an existing character. On your backup disk, your character's name will not be on the menu. Press SHIFT and the number your character was last on. Type in your character's name and you will resume the game at the point where you last saved it.
Contributor Unknown

Alternate Reality: the Dungeon: To get the maximum ability in STA, WIS and CHR, take the Goblin Ring half and give it to the Troll King. Then kill him and take the reforged ring. Throw it to the Oracle, who will give you a few points of STA, WIS and CHR. You can do this as long as you'd like, but remember that it is a good act. If you are a member of an evil guild, they may throw you out after a while.

If you get a magical item like a Silver Sash and you want to keep the points but not the item, throw it into the Oracle. Remember that you can only throw three items there each day.

To kill the Basilisk, ready your mirrored shield (which you can get from the Clothes Horses Room) as a secondary weapon and your bare hands as a primary weapon. You can't harm the Basilisk with any other weapons or spells.

The fee for the Ferryman at the River Stones is two coppers. If you pay that amount at midnight, the ferryman will take you across the river to the Land of the Undead. If you pay any other amount or at any other time, he will take you downstream.

If the Devourer is attacking you too often, you have too many items.
Contributor Unknown

Beach Head: After destroying each ship on the third screen, write down its elevation. Continue doing this each time you play, and after a few games you'll see that by determining the elevation for the carrier you can locate the match in your notes.

After finding the proper series of numbers, you'll find that these numbers are the elevations for the other ships and that they're always in the same order.
Kenneth Crews
Greensboro, NC

Blue Max: If you fly between altitudes 19 and 25, you can shoot the ships, the guns on the ground and the little red things on the ground. You can usually get between 800 and 1000 points, but watch your hits!
Dan Bernhardt
Plymouth, IA

Boulder Dash: If you get trapped between the rocks with no way out, just hit the RUN/STOP key. The board will change and your man will be deducted from your extras.
Donald Matusky IV
Address Unknown

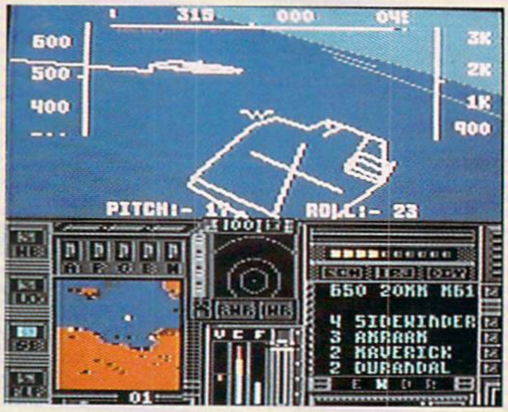
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Reviewed by John Jermaine

Project: Stealth Fighter

Computer: Commodore 64
Publisher: MicroProse
180 Lakefront Drive
Hunt Valley, MD 21030
Medium: Disk
Price: $39.95





Two MIG-23's appeared out of nowhere on my tail. Thinking fast, I applied the speedbrake to reduce my speed.

Stealth technology is a top-secret design principle, which supposedly makes an aircraft harder to detect on radar. Major Randy "Whiz" Havener is the software pilot of such a craft, and he's offered to talk us through a typical *Project: Stealth Fighter* mission.

It was a warm Tuesday morning, somewhere in the middle of the Mediterranean Sea. I was stationed on the carrier USS America. My assignment that day was to knock out two Libyan targets: (1) a radar control bunker and (2) the Ras Lanuf SAM (surface-to-air missile) Battery, located near one of their oil fields. The flight plan called for taking off from the carrier America and landing on the carrier during the mission.

I switched to the preflight checkout mode, which included weapons selection. My weapons included four AIM-9M Sidewinder air-to-air missiles, three AIM-120A AMRAAM air-to-air missiles, one AGm-88A HARM anti-radar missile and two AGM-65E Maverick air-to-ground guided missiles. The F-19 pilot has the option of flying a mission with the weapons provided or choosing new ones.

I was cleared for take-off, so I increased the throttle to full speed and released the brakes. Launching off the catapult, I quickly became airborne.

The stealth fighter cockpit is very attractive, highly detailed, and quite impressive overall. This interesting graphics display actually contains two separate elements: (1) the "Heads-Up" Display (which occupies the upper portion of the screen) and (2) the lower Cockpit Control Panel. The Heads-Up Display (HUD) initially gives the user a three-dimensional view of what lies ahead of his craft. A closer examination of the windshield provides most of the important flight data you normally need to know. Your present air speed, altitude reading and heading can be seen at the top of the screen, while pitch and roll information is available at the bottom of the display. This configuration makes it very easy to locate information, and the pilot can interpret these figures in a moment's glance. The Cockpit Control Panel is dominated by the presence of two CRT displays: the one on the left is a color monitor, which shows strategic and tactical maps, while the Monochrome Text CRT can be used to display incoming radio messages, the current damage status of your jet, weapons status, target identification, etc.

Getting back to my story, I quickly rose to a cruising height of 40,000 ft. and a speed of 450 knots. My instruments told me I had a very low electro-magnetic profile, meaning I shouldn't be visible to enemy radar.

All of a sudden, my threat display alerted me to the fact that an aircraft was closing in on my position. It must have spotted me from the air. I changed the scale of the radar screen to reflect a 25-mile sweep, and as I opened the weapons bay door, the system simultaneously identified the intruder as a MIG-23 Flogger. I quickly deployed an AMRAAM missile to vanquish the foe. The door was immediately closed again to maintain my stealth profile in the air.

Here's a tip for the software pilots out there: don't use the same sweep display all the time. The 25-mile mode is handy enough, but sometimes it allows your foes to stalk you from a distance and instigate an attack you really aren't prepared for (especially from behind). As the mission progressed, I experienced one of those situations: two MIG-23's appeared out of nowhere on my tail. Thinking fast, I applied the speedbrake to reduce my speed. This simple maneuver caught my enemies totally off guard. They shot out in front of me, instantly becoming vulnerable to attack. After some fancy maneuvering, I was eventually able to shoot Sidewinder missiles down the throats of these two buzzards.

When I finally reached the SAM missile installation area, my craft had dropped to an altitude of 14,000 feet. As the fighter rapidly approached its target, I continued to descend at a steady rate. This was necessary because every missile and bomb has a specific range of operation it must be dropped or launched from. If you're too high or too low, for example, the device doesn't arm properly and won't get the desired results. In this case I was using a Maverick missile, which has a 300-30,000 feet operation zone. I leveled off and fired at a height of 5,000 feet. Once I completed this textbook attack sequence, the jet climbed to a much higher altitude (where I could take advantage of my stealth design). Enemy radar traffic indicated the target had been destroyed. Before this site became history, it managed to fire a surface-to-air missile in my direction. I quickly responded by switching on the radar jammers and deploying a decoy, to lure the projectile away.

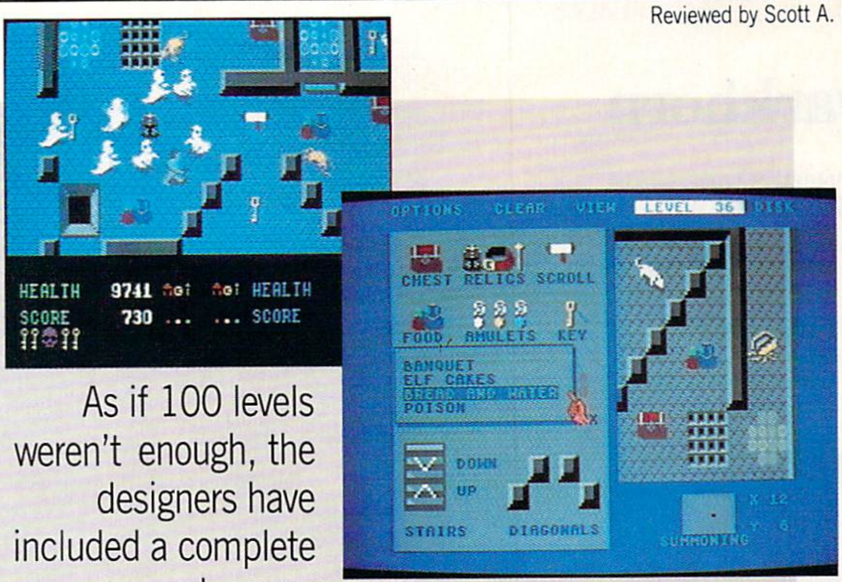
My fighter survived this interesting attack, but a moment's hesitation on my part would have ended things right there. I eventually participated in three other dogfights, during the course of this scenario, where my arsenal of missiles sent three MIG fighters to a watery grave.

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Reviewed by Scott A. May

Demon Stalkers

Computer: Commodore 64
Publisher: Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
Medium: Disk
Price: $29.95



As if 100 levels weren't enough, the designers have included a complete dungeon construction kit.

From the land down under comes a game that takes players 100 levels under, in one of the most exciting arcade challenges of the year. Australian design team Micro Forte has created the perfect arcade/role-playing hybrid in *Demon Stalkers*, a madcap odyssey stretching beneath the earth and beyond reality.

Demon Stalkers casts one or two players as the reluctant hero(es) of a kingdom that rests atop a 100-level dungeon. Construction of the dungeon has awakened Calvrak, a vile and hideous creature that threatens the kingdom with death and destruction.

Looks like you picked the wrong time to volunteer for an assignment. You must travel down through 99 monster-infested levels and slay the evil Calvrak in its lair on level 100. Afraid? Drag along a friend, kicking and screaming. After all, it's no fun going insane all by yourself.

The *Demon Stalkers* "flippy" disk contains the master (boot) program on one side and the dungeon scenarios on the other. Players are strongly advised to make several backup copies of the unprotected scenario disk. A good idea is to create two disks for one- and two-player games. Any full-disk copier will work—one is even supplied on the master disk.

Before the game begins, a short menu allows selection of one- or two-player cooperative modes. Although solitaire games are quite enjoyable, *Demon Stalkers* boasts one of the finest two-player cooperative games ever designed. The advantages of working as a team are obvious: it is faster, safer and gives you someone (living) to talk to. It is also a laugh riot—stumbling into each other in a panic—not unlike an old Abbott and Costello movie.

Working with only a few dozen game elements and an equal number of game variables, the designers have created 100 completely unique dungeon levels. The action is viewed from above, spotlighting the crisply textured 3D graphics.

Each player's on-screen persona moves with remarkable animation. When playing alone, the main character remains at the center of the screen. Moving causes the graphic window to scroll in one of eight directions. In two-player games, each character acts independently, but must remain on screen together and travel in the same direction.

The basic structure of a dungeon level is that of a maze, roughly ten times larger than the screen. Various types of stone walls and doors section each level into rooms and hallways of insidious design. Most levels are enclosed on each side, although some wrap around, adding to your confusion.

The object of each level, quite simply, is to exit to the one below it. Okay, so it's not *that* simple. First you have to solve a puzzle, perform a task or collect certain objects. Players are allowed to travel freely in both directions. In fact this concept is often part of a multi-level puzzle.

Players begin the game with a relatively small amount of health (hit) points and feeble attributes (strength, armor and magic). Health points are lost through contact with monsters and gained through consumption of food. Some food is poisoned, so watch for signs before pigging out. Your various attributes gradually decrease on their own, but increase upon discovery of special relics.

Players are created with a rapid-fire crossbow and an endless supply of arrows. To shoot, simply face in one of eight directions and hold the fire button. The effectiveness of your arrows depends on the monster in question as well as your strength and magic attributes.

On-screen objects include chests, relics, treasures, food, artifacts, amulets, keys, scrolls and bells. Chests may be locked or unlocked and may contain any of the above items.

Amulets offer the player temporary magic, both good and bad, including: wall walking, invisibility, extra speed, and paralysis. Amulets are generally found in the lower region and often play key roles in escaping from a particular level.

Scrolls come in many varieties, also good and bad. Text scrolls offer hints to solve puzzles or warnings to avoid certain objects. Death scrolls enable the player to destroy most monsters within the immediate vicinity. The Slow Death scroll, however, slowly drains the life out of a player until he exits the level. Other scrolls offer bonus points and open all two-way doors on a level.

Bells are also found at lower levels. These stationary objects offer temporary magic—good and bad—but unlike amulets, they can be used repeatedly.

Finally, artifacts that offer even greater magic can be found deep within the dungeon. Some of these are essential to victory and must be found.

The monsters found in *Demon Stalkers* are among the most persistent and cruel found in any game of this type. Rats literally pour out of sewers by the dozens, drawn to your character like moths to a flame. Snappers—man-eating plants—remain docile unless shot by your arrows. They immediately come to life and swarm

Continued on page 91

Reviewed by Jeff Seiken

Darkhorn

Computer: Commodore 64
Publisher: The Avalon Hill Game Company
4517 Harford Rd.
Baltimore, MD 21214
Medium: Disk
Price: $30.00

Victory and defeat hinge on the number and type of warriors fielded by each army, as well as the terrain they are fighting over.



Darkhorn is a game of war and conquest set in a mythical realm populated by elves, dwarves and men. Up to four players can participate, each taking the part of one of the different factions battling for supremacy in the land. Now most computer games capable of accommodating multiple players do so in a way reminiscent of musical chairs: one person gets to sit in front of the computer while the others wander around the room anxiously awaiting their turn at the keyboard. In *Darkhorn*, however, everyone competes at the same time.

Darkhorn manages the neat feat of simultaneous play through a simple orders routine that allows players to share the keyboard if necessary. The process of entering commands requires the use of only three keys, thus making it possible to allocate a corner of the keyboard to each participant. Any combination of joysticks and paddles can also be used for implementing orders, a more practical alternative that helps relieve the potential crush of hands, arms and elbows around the keyboard.

Darkhorn is played in real-time without the benefit of structured game turns. The only factor limiting what a player can do with the forces at his command is that every action an army performs requires the expenditure of action points. When an army exhausts its supply of action points, then it must sit tight until it receives more. Armies accumulate these points over time, depending on the game speed selected. At the lowest speed, for instance, armies accrue one action point every 54 seconds, a slow-motion pace that gives you practically all day to reflect on the current situation between moves. At the highest setting, however, armies gain new action points in the blink of an eye, demanding equal quickness of thought on your part.

The object of *Darkhorn* is to capture the other factions' strongholds while, of course, protecting your own. Each player begins the game with two armies consisting of a handful of dwarven, elven or human warriors. Armies can expend action points to recruit additional warriors to their side, but only in certain locations: elves are found in woods, dwarves in hills, and men in towns. An existing army can also deploy a part of its strength into an adjacent square, in effect creating a new army.

Combat occurs when hostile armies occupy the same location. In general, victory and defeat hinge on the number and type of warriors fielded by each army, as well as the terrain they are fighting over. If the warring parties like, the computer will swiftly resolve the battle and declare a winner. Otherwise, players may fight it out themselves in an arcade sequence featuring two semi-animated warriors trading blows. The arcade option chiefly amounts to a test of reflexes, but it does have the appeal of adding a random component to combat resolution. By dint of swifter reactions on the part of the controlling player, a smaller force at least stands a chance of defeating a larger one, whereas the stronger army virtually always wins when the computer determines the outcome.

No matter which option is chosen, battles are very bloody affairs. An army either wins or dies, with no retreat permitted. Of course, victory carries its own price, too. In fact, a fight between evenly matched combatants is likely to leave the victorious army with a single surviving warrior. Given the high cost of combat, players will quickly learn that there are only a few things worth fighting for in *Darkhorn*.

As a multi-player game, *Darkhorn* works exceptionally well. The game system keeps everybody busy and happy with a minimum of confusion. The only problem I've experienced arises from the crowded condition of the army display. The four boxes showing the status of each player's active army are bunched together at the bottom of the screen. This makes it very easy to get distracted by the information flickering across the different parts of the display and even momentarily lose track of which box applies to your side. A rather simple solution would have been to spread out the boxes among the four corners of the screen.

One of the best features about *Darkhorn* is its flexibility. For starters, the computer can fill all positions left vacant due to a shortage of flesh-and-blood opponents. *Darkhorn* also lets you alter the skill setting on a per player basis, a perfect tool for balancing games between players with varying levels of experience. More interesting still, *Darkhorn* includes eight different maps and the choice of fighting either a single campaign on one of them or waging a grand struggle across all eight in turn. In the latter case, the overall winner then gains the honor of battling the mysterious Darklord himself (itself?) in a climactic confrontation on an

ninth map. Finally, in case anyone should hunger for further variety, *Darkhorn* is also able to generate a limitless number of random maps.

The maps are of such size that each player usually begins the game within striking distance of another side's stronghold. Although the victory conditions call for the capture of these towers, don't be lured into making an early attack on someone else's ramparts. Towers are a false grail in *Darkhorn*. The secret of victory lies with control of the hills, towns and woods scattered around the map—in other words, the limited number of locations where new warriors can be recruited. The player who can establish a larger recruitment base than his rivals possesses a powerful and in all likelihood decisive advantage in the game.

You should form your strategy around the theme of expanding your recruiting base at the expense of the other factions. Concentrate your resources on defeating one enemy at a time; whichever player's stronghold lies closest to your own makes the most obvious—and sensible—target initially. Once your armies are in a position to replace their losses faster than your opponent, you can force him into an uneven battle of attrition and steadily whittle away at his strength. Your ultimate goal should be to deprive that player access to all recruiting squares. Should you manage this feat, then the outcome—complete destruction of the other faction's armies and conquest of its tower—become a foregone conclusion.

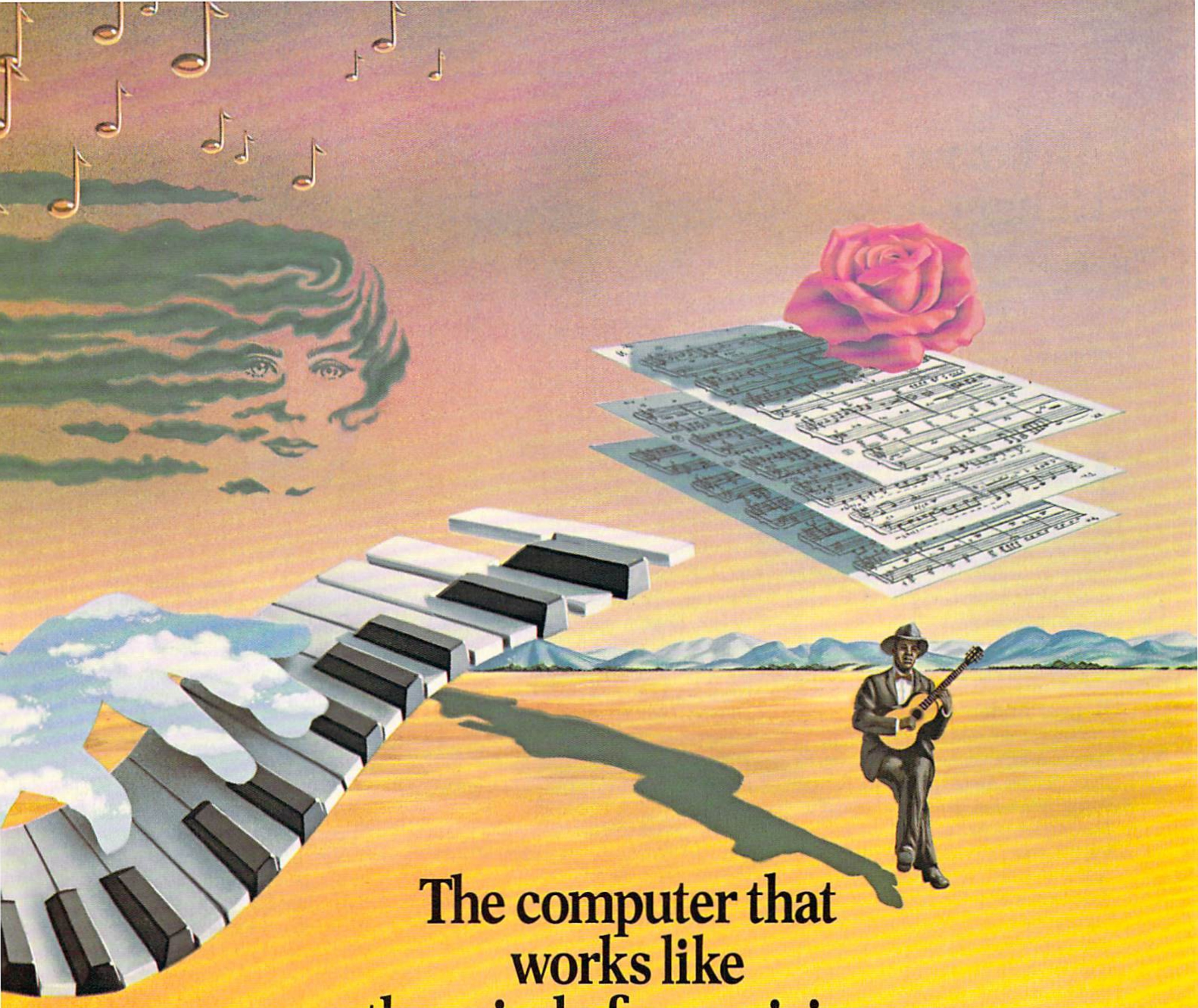
The system offers few rewards to players who take risks or act rashly.

The high cost of combat combined with the need to devote a large proportion of your action points to recruiting leads to a game that often seems more static than dynamic. But that's the nature of *Darkhorn*. The system offers few rewards to players who take risks or act rashly. The computer-controlled factions put up such a tough fight in the game precisely because the artificial intelligence wages a very cautious campaign. The computer executes its strategy with perfect patience, building up a powerful base for recruiting, while at the same time fortifying its stronghold and every other area of importance. Only after securing its own territory will the computer's armies begin to encroach on the territory of the other players. This slow, measured approach is extremely effective, and *Darkhorn* rates as one of those rare games where it actually makes sense to follow the computer's lead in strategy.

Darkhorn pays only lip service to its fantasy setting. There are no heroes or wizards, no magical weapons to wield or magical spells to cast. *Darkhorn* is more of an abstract strategy game couched in fantasy terms. A better way to characterize *Darkhorn* would be to call it a strategy game with overtones of fantasy.

In *Darkhorn*, the emphasis falls on resource management. This description may sound dull to anyone except a banker or stock broker, but that's what the game boils down to: using your armies in a cost-effective manner to further their growth. Of course, we're not talking about expansion through peaceful means here. Moreover, the fact that you are engaged in a four-way power struggle rather than a one-on-one confrontation livens things up considerably. And finally, what other game can you play when three friends show up at your house looking for a little competitive fun? ■


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Only Amiga Makes It Possible.

Reviewed by Jeffery Scott Hall

Airborne Ranger

Computer: Commodore 64
Publisher: MicroProse
180 Lakefront Drive
Hunt Valley, MD 21030
Medium: Disk
Price: $34.95





Each mission will be completely unique; mission venues range from the scorching deserts to the frigid arctic regions.

Just when you thought it was safe to take off your combat boots along comes *Airborne Ranger,* a fast-paced action war game from MicroProse Software. After you have loaded the game, you will be shown three different title screens while music plays in the background. To speed things up (since you can't wait for your assignment) you may press the space bar to skip past the pictures.

Ranger Assignment

Next you are taken directly to the Ranger Assignment menu. Here you have three choices: Assign a Practice Ranger, Assign a Veteran Ranger or Format a New Roster Diskette. If you are just starting the game, you should select the third option and insert a blank disk. Once you have formatted a Ranger disk, you should select either option one or two. This depends upon if you wish to practice combat or go for the "real" thing. If you choose the second option you will be taken to another screen which displays the ranger's status, rank, name, current score and Medals of Honor. To create your own ranger select one that has the initials KIA (Killed in Action) beside his rank and name. You will then be prompted to enter the name of your choice, which will be saved to disk. Making a selection is as simple as moving the joystick up and down to highlight the option you want and pressing the fire button. (This procedure is the same for all other screens.) Now comes the hard part —which mission to choose.

Mission Objectives

You will find yourself overwhelmed by the number of missions listed, these are: Destroy a Munitions Depot, Steal a Code Book, Disable Enemy Aircraft, Capture an Enemy Officer, Cut a Pipeline, Knock Out Enemy Radar Array, Disable SAM Site, Liberate a P.O.W. Camp, Photograph an Experimental Aircraft, Free the Hostages, Create a Diversion, and Delayed Sabotage. Each mission will be completely unique; mission venues range from the scorching deserts to the frigid arctic regions. You will also find that each mission possesses a different challenge. For example, you might be able to go through one mission like Rambo and blast anything that moves, yet on another mission you might have to sneak past certain areas without being seen or heard.

In the upper-right corner of the screen, you'll see the mission challenge level. This indicates the level of difficulty for the mission you have highlighted. Once you have decided upon your mission, you will be requested to take the Fatigue Test if you have not done so already. This test requires you to correctly identify one of six different campaign ribbons, from a total of 24 (these are pictured in the manual). To select the one you want, move the joystick left, right, up or down to highlight your choice and press the fire button. If you have identified it correctly your mission will begin.

Deployment

The first stage of your mission involves the deployment of three supply pods, and of course yourself. You will find yourself in a plane, called an Osprey, flying over an exact tactical representation of where your combat will take place. While the Osprey flies over this area you may move it from left to right, dropping your supply pods where you think would be best for pick up. You will have to make quick decisions as to where you want them, for you have only a certain amount of time before bail-out. When the buzzer sounds, and the green light flashes, it's time to strap on your parachute . . . Geronimo! Now, your plane will disappear and you will find yourself floating to the ground. You can partially control where you're going to land by pressing the joystick in that direction. Once you are on the ground the action begins.

War

You are a one-man army embarking on missions that "normal" people would consider suicidal! But not you, that is why you were chosen for the mission you are currently on. At your disposal you will find five different weapons: the Carbine machine gun, fragmentation grenades, LAW (light anti-tank weapon) rockets, timed plastic explosives, and of course your trusty bayonet. In the upper-left corner of the screen you will find the weapons box which has a graphic representation of the current weapon, and the amount you have on hand (e.g., three grenades). You may switch back and forth between weapons by pressing one of the four function keys, or set a time bomb by pressing 5, 6, or 7 (depending upon if you wish to have a 5, 10 or 15 second bomb, respectively).

One of the nice things about this game is that you are in complete control of your character—that includes walking, running, crawling, and handling weapons. The screen is in a constantly-scrolling, 3D perspective, which makes the combat so realistic that your teeth chatter every time you get shot at.

During your mission you will find trenches to crawl in, water to swim in and ice to fall on. If you learn to use these elements of nature, you have a better chance of survival. The enemy is easily distin-

Continued on page 90

Reviewed by Russ Ceccola

4th & Inches

Computer: Commodore 64
Publisher: Accolade
550 S. Winchester Blvd.,
Suite 200
San Jose, CA 95128
Medium: Disk
Price: $29.95

When was the last time that you experienced the excitement and reverie of an NFL football game in your own home? Has *Monday Night Football* failed to quench your thirst for the sport that separates the boys from the men? Then turn your television screen or computer monitor into a football widow's enemy. Accolade's latest release, *4th & Inches,* will do just that by providing another means of escape into one of America's favorite pastimes—watching or (especially in this case) playing football. *4th & Inches* is the most realistic football game program ever released for the Commodore 64 or any other computer, combining an easy-to-use game system and the freedom of player selection and variation.

To prove my point, let's start out by talking about what *4th & Inches* doesn't have. There are no penalties, except in one-player mode (and that's only one exception), because there are no referees. This takes away from the realism of the game, but the oversight is more than made up for by the intensity of the game play as the quarters move along.

The only other thing missing from *4th & Inches* is the ability to use different teams. Although the teams are the same every time you play, they are balanced so that neither side has an unfair advantage and both teams' members run the gamut of player types. I expect that Accolade may put out team disks, but *4th & Inches* is not a statistics-type game—it relies more heavily on the plays you call and the team formation on the field.

4th & Inches is played on two screens: the game screen that depicts the field, offensive and defensive play boxes and time/yards to go box and the Coaches' screen that shows all the players. The purpose of the Coaches' screen is to change the current team composition or to call a time out. The Coaches' screen is accessed by hitting the space bar, although rules govern when it can be called up. In two-player games, the Coaches' screen can be brought up at any time. In one-player mode the screen may be used to alter the team members any number of times before formation choice, but only once per quarter after the formations have been selected, or a five-yard penalty results. Only three time outs are allowed per side per half, but team changes may be made according to the above rules. If the Coaches' screen is accessed after the team formation is chosen in a one-player game, a five-yard penalty is assessed to the offender (the only game penalty). Other than these simple rules, feel free to check out the guys who are out on the field, sweating and grunting to bring home a win.

Never has computer football been easier to play than with *4th & Inches.*



The game screen is the place where most of your attention will be focused. It consists of four parts, each of which is integral to your survival on the field. The main portion of the screen depicts the astroturf surface in all its glory from a slightly slanted perspective, which tends to help you determine how far off the ground the pigskin is flying. One box at the bottom of the monitor shows possible offensive choices and another equal-sized box matches with defensive options. Finally, important game information is assigned to the final screen section, with the time remaining, down, yards to go, quarter and score updated when necessary. The game screen is very functional and also contains everything you need to control the offense and defense in one place.

Never has computer football been easier to play than with *4th & Inches.* The game is entirely joystick-controlled, with not so much as a team or player's name requiring keyboard input. The two teams are the AllPros (red jerseys) and the Champs (blue jerseys).

The idea of the player assuming the roles of both coach and team member is not new at Accolade. It was used once before, quite successfully, in *HardBall! Hardball!* goes undefeated as the finest baseball game for computers, with its only serious competition in *Earl Weaver's Baseball,* gaining recognition because of its use of the power in higher-memory machines. Ironically, the designer of *HardBall!* also developed *4th & Inches* (Bob Whitehead), promising future success for this true-to-life football game. What stands *HardBall!* and *4th & Inches* apart from other sports games is the unique player interface. Both are played by moving a highlighted bar through the menus, clicking the joystick button on the desired game option. Both games also feature control of one player at a time on the field of play, with that player blinking to identify him.

All comparisons aside, *4th & Inches* will earn your respect the instant you make your first play. With each play, both sides make three choices in succession, independent of what direction the opposition follows: team formation, play selection and player position controlled. Both offense and defense are presented with five choices for each of the three stages of play setup. In all cases, the offense has a pool of more options than the five that appear on the screen and more total combinations of choices than defense. All options in the three setup stages depend on previous selections.

As far as choosing the team's formation, defense will always have only five options. The five team formation choices that appear onscreen for offense depend on the current yardage and down. The five are taken from 11 possibilities. After team formation is decided, the actual play is selected. The offensive play choices that come up in the offense box depend on whether the team formation is a running, kicking or passing one. Defensive plays are virtually the same every time. Finally, both offense and defense must choose the player position that will be controlled on the screen in the play.

All choices in the three stages of play setup are done via joystick. Each stage is completed by holding the joystick in one of four directions or leaving it centered (hence the five options per stage) and pressing the button. In setting up the play,



each side's decisions are independent of the other because of the game system. Four arrows (and a dot in the case of a centered joystick) are placed in a column between the five offense and defense options to indicate the direction in which the joystick must be moved to make a selection. In this way, unless your opponent examines which way you move the joystick before pressing the button, only you know what choices you have made. In a one-player game, you move a highlighted bar, since opposition examination of your choices isn't a problem.

This way of playing *4th & Inches* takes away the drudgery of game play and brings some fun into an area of sports games that has previously been dominated by tiresome programs meant only for statistics freaks who like pairing off famous Superbowl teams in bargain-basement football action/stat games. The only catch to setting up plays in *4th & Inches* is that you have to do it fast, for the clock is running while you choose strategy. This timing factor adds extra realism to this fast-paced game and ensures that true football savvy rules the field.

The game manual is only ten pages long—and rightfully so, for it takes less than a minute or two to learn how to play *4th & Inches*. Most of the time will be spent in playing actual games that test your ability to maneuver an onscreen player and, more importantly, your command of football strategy and knowledge of what plays to use and when. Having never really examined football in detail before, *4th & Inches* taught me some things about the sport that I never knew, including some formations and their strengths. Plays and their execution also rub off on you after a couple of hours with *4th & Inches*. This knowledge is augmented by the depiction of the direction on the field that plays follow and position of team members in scrimmage in the manual.

The team members in *4th & Inches* are rated according to speed and strength. The assessment at the opposite ends of the spectrum are SPEED! and BIG!, with SPEED! next to a player's stats indicating the fastest and smallest players and BIG! presenting the slowest, biggest and strongest team members. Six ratings between these extremes show the relative speed, size and strength of the player in question. To prove the usefulness of such ratings, players are examined after every play, and their performance is adjusted according to the number and types of plays in which he has taken part. As the game wears on, the football heroes show the affects in their playing abilities.

The graphics in *4th & Inches* are clear and the players are more than just X's, O's or blocks. The animation is done well, with little left to desire. The screen only shows 20 yards at a time, but it instantly scrolls when the ball passes off one edge of the screen to show the next 20 yards. This effect was a nice touch to the game. Another "plus" is the option for 5-, 10- or 15-minute quarters, putting game length in your hands rather than forcing an hour-long game upon you. Sound is adequate for the needs of the game, which aren't too many.

Overall, *4th & Inches* delivers what Whitehead intended to bring home to computers: an accurate portrayal of football strategy and action put into an exciting environment and coupled with an easy-to-use interface. Now go flip a coin and make a kickoff!

*[**Editors Note:** Accolade has released a* 4th & Inches Team Construction Kit *for $14.95.]* C

Coil Cop

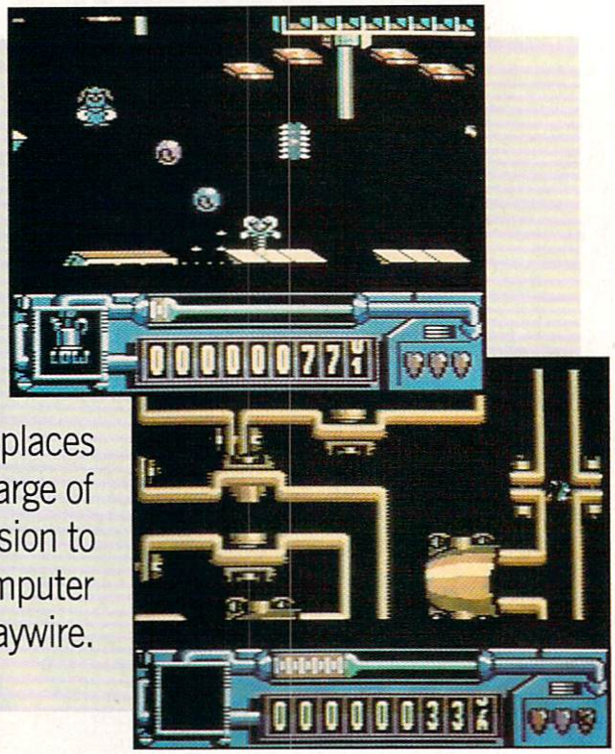
Computer: Commodore 64
Publisher: Epyx
600 Galveston Drive
Redwood City, CA 94063
Medium: Disk
Price: $24.95

Original arcade-type games for home computer systems have never been too successful. What it comes down to is that people would rather see a translation of a favorite arcade game to their system (thus saving quarters and trips to the arcade) than games that are only available for a specific computer or group of computers. Epyx tried to grab the market of arcade game aficionados with the introduction of their Maxx Out! series of low-priced games. So far, each of the offerings has been a good, solidly-designed action game that worked well. Add to the list yet another unique entry into the series—*Coil Cop,* an entertaining game that places you, as the title character, in charge of a mission to stop a computer gone haywire.

The inside cover of the manual warns that you shouldn't read the rest of the manual because it takes away from the enjoyment and discovery of the goal of the game. I found just the opposite to be true. Without reading the manual, I could hardly figure out what to do in *Coil Cop.*

This is my only complaint about the game. I realize that Epyx was trying to make the experience better for the consumers. But, because the instructions don't offer that much help anyway other than showing pictures of the objects and characters in the games, you have to read the other four pages of brief instructions to get some idea of what you are trying to do in *Coil Cop.* Other than this ill-fated attempt at preserving enjoyment of the game, *Coil Cop* is first rate entertainment.

Coil Cop throws a lot of different characters and many different rooms and scenarios at you to keep you busy. It is a challenge through and through, and you can't expect to conquer the game right away. Your goal is to travel through different rooms in a toy factory to collect pieces of a computer program that will reverse the effects of the bug-ridden computer's actions. The computer has been producing evil toys in the factory, and by reassembling the correct program you can defeat the toys and stop the computer. It sounds easy enough, but those program pieces are placed in the most obscure places throughout the factory.



Coil Cop places you in charge of a mission to stop a computer gone haywire.

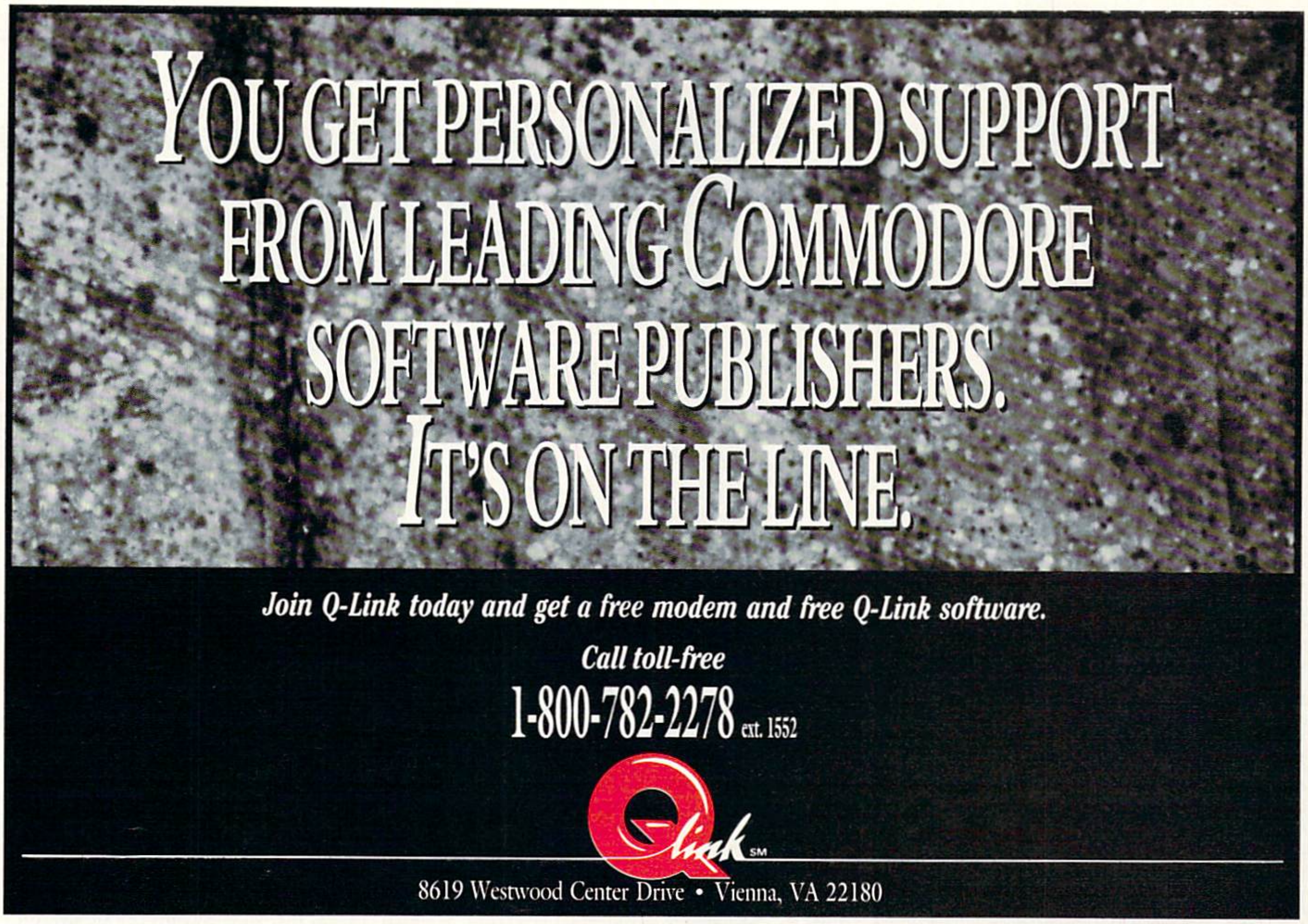
There are actually two parts to *Coil Cop.* The first involves navigation through an assembly of pipes to reach a desired room. You use your joystick to guide the title figure through the maze of pipes to rooms that you haven't visited yet. You can reverse direction by pressing the button, but the number of times you can do this is limited. This part takes no more than five or ten seconds to finish, since its only goal is to get your character into a room in the factory (the pipes represent the factory's plumbing). After deciding which room to enter, the duct work magically places you in that room for the main part of your toy factory adventure: examination of every area of the room and collection of pieces of the computer program.

There are many different types of rooms in the factory. One looks like it's made of logs, and another appears to be immersed in water. Still another has lots of slides and pipes to help you move around the room. In any case, each place tests your joystick skills, for navigating them will take some time. I strongly suggest that you pick one room and stick with it until you find out where everything is in the location, especially the pieces of the computer program. In this way, you can be sure of completely clearing at least one place in the factory.

The pieces of the computer program take on one of four forms: cassette tape, ROM chip, floppy disk or listing papers. When you move your character over a piece, it disappears, and the percentage of the program that you've collected flashes in an information box in the lower-left corner of the screen. Moving your character in *Coil Cop* is no easy matter, especially since there are so many different room configurations and obstacles, requiring that you learn how to handle every situation.

You move around in *Coil Cop* by using the joystick to move left and right and pulling the joystick down to "coil" up the character on the spring underneath its body. By pulling down and then pushing up on the stick, you release the coil and bounce the character. The key to success in *Coil Cop* is learning how to bounce the title figure with this up-and-down movement. Only through extended practice in different rooms will you get a handle on moving the digital defender.

In addition to bouncing up and down, you must also be able to bounce diagonally. This is accomplished by pressing the joystick button and timing a movement to the left or right so that you do these



things when the figure lands from a bounce. Only then will your character be completely in your control. Keep in mind that none of what I've said about bouncing diagonally is found in the manual—I stumbled upon it. Once you can move the cop skillfully, you can begin to concentrate on your goal.

In any given room of the factory so many things confront you that it's hard to describe them without a picture or seeing them on the screen. There are nine evil toys that pester you, with Gerald the Gremlin and Blue Meanie the most annoying. The on-screen cop needs oil to survive, as shown by the oil indicator bar in the lower part of the screen. You must replenish oil by finding cans. The evil toys hurt you in that they take away oil when touching the cop. To avoid this, try to bounce on top of the evil toys before they touch you—this action beats them at their own game and preserves your precious oil.

The key to getting oil and points and surviving to complete the computer program is bouncing and hitting (from underneath) certain platforms in the rooms that have a question mark on them. One of three things can happen when you hit

It is a challenge through and through, and you can't expect to conquer the game right away.

these platforms: you get extra points, you get extra oil or a heavy weight appears and begins to fall, causing you to lose a life if it hits you. Knowing which platforms to hit to get oil and points is crucial—the others can be used as stepping stones to higher parts of the rooms.

Unfortunately, you don't get to see all of a room at one time—only one small part of it. This means that you don't know how many pieces of the program are in the room—a great nuisance. An option that shows a map of the entire room would have been nice, without detracting away from the challenge of the game.

Each room in the factory is made up of a number of different elements that combine to form a unique area to explore. Along with mystery platforms, there are those that move up and down as you hit or stand on them, those that crumble underneath the cop, those that delay time in the game and those that do nothing. Also, there are doors, conveyor belts, lasers (that also deplete oil if touched), slides, pipes, blowers, bounce pads, door delay buttons and alien bonus buttons. Not all of these features are in each room; instead, rooms tend to include a lot of one type of obstacle, perhaps uniquely mixed with some combination of other types. In any case, each room poses a tough challenge and you'll have your work cut out for you.

Coil Cop is one of those games that reminds you enough of another game to make a comparison, yet still breaks off in its own directions. To this extent, *Coil Cop* plays like a combination of *Toy Bizarre* and *Heist,* with a lot more action going on than either of those has to offer. The graphics are very good, with a large emphasis on animation that is unique for each evil toy and the cop itself. Although I haven't found more than twenty-five percent of the computer program that defeats the renegade computer and evil toys, I'm sure that you will get your money's worth from this action/arcade game. Sound effects, music and graphic detail are all strongly used to present a worthy addition to any arcade-lover's software collection. ■

Reviewed by Steve King

The Three Stooges

Computer: Amiga
Publisher: Cinemaware
4165 Thousand Oaks Blvd.
Westlake Village, CA 91362
Price: $34.95





Using the joystick to throw and duck, pies start flying everywhere, accompanied by Curly's trademark "Nyuk, Nyuk, Nyuk."

In a creative burst of energy, the folks at Cinemaware have made a work of sheer genius and artistic delight out of what could have been a pointless, inane game. From the opening credits (which I won't describe for fear of spoiling one of the most humorous parts of the program) to the last scene, Cinemaware has squeezed every last ounce of technical capability from the Amiga computer and used it to present the most unique computer experience I have ever encountered.

The Three Stooges is an animated, cartoon-like, three-dimensional board game. Replete with digitized pictures and sounds, professional music scores and arcade-quality game sequences, it duplicates some of the most famous scenes in the Stooges' movies. In fact, the program uses 150 distinct digitized sounds. The game opens with the all-too-familiar *Three Stooges* theme song and the cigar-puffing Mr. Fleecem, president of the Skin and Flint Finance Corporation, telling poor Ma (who runs Ma's Orphanage) that everyone will be kicked out unless the rent is paid within thirty days. With a dramatic silent movie score playing in the background, Moe, Larry and Curly (little animated characters with clearly recognizable faces) shuffle by and offer to help raise the money—hoping to win the hearts of Ma's three lovely daughters. Off the Stooges go and the game begins.

Scene Two: Stoogeville, U.S.A., on a one-way street consisting of 180 blocks, or game squares. Above the Stooges is a series of six boxes representing the next six squares on the gameboard. Each box contains an icon depicting a different event where the Stooges can earn money, and there are always several mousetraps set to spring. Just below is information showing the day number and the total money earned. A little hand—Moe's hand, to be precise—begins to cycle across the squares in a random fashion and by pushing the joystick button, you can stop the hand on a specific square, or at least try to. The Stooges then walk off to that particular scene. If you happen to stop on a mousetrap, it snaps shut. You lose a day and Moe loses a finger. If Moe loses all his fingers, the game ends and you proceed to the closing scene.

Some of the icons require no action on your part. For example, the dollar sign sends the Stooges to a block where they find money. The icon of Mr. Fleecem sends them to the First National Bank and Distrust Company where, more often than not, Mr. Fleecem collects taxes. The Question Mark icon will randomly send the Stooges to any one of the other scenes, each of which is accompanied by an excellent four-channel stereo soundtrack.

The remaining icons each represent an arcade-type game which is based on a famous scene from the Stooges' films. The first is the Slapping Game. While you can't earn any money here, it serves a strategic purpose. As the game progresses, Moe's hand speeds up to a point where you can't really control where it stops. The Slapping Game lets you slow it down; for ninety seconds, you are given the opportunity to control Moe as he slaps, pokes, kicks and pulls the ears of Larry and Curly. With every jab comes a different digitized and recognizable sound, scream and whoop. If you do a great job in pummeling Larry and Curly, then Moe's hand slows down considerably. A bad job results in a hand that moves faster than the speed of light.

The Hospital Scene, where the Stooges play doctor, is based on a sequence from their film *Men in Black.* The object is to race through the hospital halls and reach the operating room as quickly as possible. The sooner you get there, the more money you earn. The Stooges have an advantage, though—they're riding midget race cars! You can earn extra money by picking up hospital supplies dropped by a careless nurse pushing a cart in front of you. Of course you must avoid hitting patients on crutches, on gurneys and in wheelchairs who always seem to pop out in front of you. When hit they go flying and sprawling, and the Stooges lose time and points. Five hits and you're out. I found that you can earn the most money here, simply by going full speed ahead and staying directly behind the cart. Good Luck.

The Pie Fight scene is, well, a pie fight scene, taken from *Hoi Polloi,* one of the Stooges' earliest films. At the Hoiti Toiti Club (where the Stooges are mistaken for caterers), they earn ten dollars for each pie "served" to three formally-attired guests. Serve all the pies (which increase in number as the game progresses) and you double your money; but get hit in the face five times by pies thrown back by the customers and the Stooges lose their job. Using the joystick to throw and duck, pies start flying everywhere, accompanied by Curly's trademark "Nyuk, Nyuk, Nyuk."

The Cracker Eating Contest, sponsored by the Porcupine Lodge, comes from *Dutiful But Dumb,* a 1941 short. The object: spoon as many oyster crackers from a bowl of oyster stew as you can. It sounds easy, but you have stiff competition—from several live oysters residing in the bowl that rise to the occasion to snatch the crackers out of the jaws of victory. This scene makes excellent use of digitized photos. (And watch for the oysters to

Continued on page 87

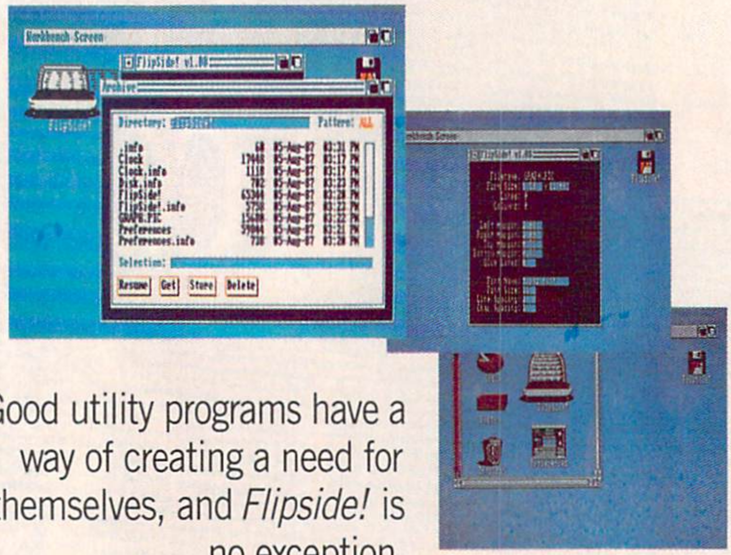


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Reviewed by Gary V. Fields

Flipside!

Computer: Amiga
Publisher: Micro-Systems Software
12798 W. Forest Hill Blvd.
W. Palm Beach, FL 33414
Price: $59.95



Good utility programs have a way of creating a need for themselves, and *Flipside!* is no exception.

Flipside! is a utility program which will literally turn cartwheels to satisfy the user's printing needs. It is a utility capable of rotating and printing almost any file vertically on paper instead of horizontally. When activated, *Flipside!* centers a simple menu on the screen. The first requester displays the name of the file you want to print sideways. The next requests what size paper your printer handles (the default is the standard 8½ by 11 inches). If your printer handles wider paper you simply input the size. Next, you input the size of the left, right, top and bottom margins you want the document to adhere to while printing.

There is another unusual requester called "glue lines." This feature is useful when printing extremely deep documents. It lets you determine at what line you will divide the information printed to minimize any manual assembling and get the most professional-looking results. The default value is 66 and will not need to be changed unless you have created an extremely large document (huge spreadsheet) or use a large font size. The manual explains (with examples) how to determine where a page should break.

The rest of the menu lets you select which font and size you will use to publish your text as well as the line spacing and amount of space between each character. These controls let you be very selective in how your final, sideways printed document will appear. Thus, although the document may have been created using topaz 8, you can substitute any font you prefer to actually print the document. Of course, the larger the font size, the more paper it will take to print your document and the longer it will take to finish it. But the ability to do this is a real plus. *Flipside!* can manage font changes or sizes which would normally take hours to rekey manually almost instantly without a blink or mistyped key.

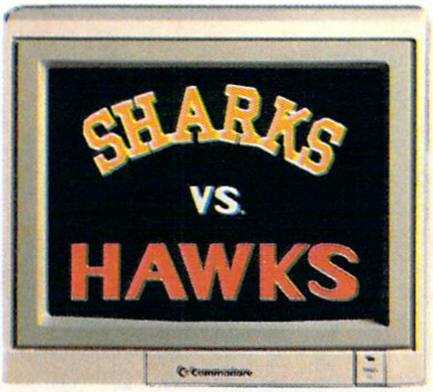
The most obvious use for this utility is for printing documents which utilize more than 80 columns (the norm for paper eight inches wide). The major candidates for treatment by *Flipside!* are spreadsheet programs which are routinely wider than they are deep. All professional spreadsheet programs are designed to handle far more than 80 columns, so the user must scroll right and left to inspect all columns on the screen. The problem comes when it is time to dump the spreadsheet to a printer for hard copy. Because most printers work with paper that is 8½ inches wide, dumping all the cells of a spreadsheet requires the user to dump sections at a time and then manually assemble the data using scissors and tape—a mess which can make the most impressive information appear less than professional. *Flipside!* removes all the headache, pain and sophomoric results associated with that task. With just a click of the mouse the program loads the sheet, rotates it 90 degrees and prints it using the font of your choice. The result is a professional document which is instantly ready for presentation.

Flipside! is compatible with most standard Amiga file formats including IFF. This means if you need to rotate and print a graphic designed with almost any Amiga paint program, *Flipside!* can do it. Possible uses might be to print an ultra-wide banner, customized book cover, folding booklets to fit 5×7 format or any other graphic which would work better printed sideways. The same is true of standard ASCII text files. *Flipside!* can flip and print them as handily as a good cook can flip a pancake.

The question to ask before you plunk down your money for the program is do you need this utility? Some spreadsheet programs come with their own version of sideways printing. If yours does and you are satisfied with the printouts it produces, you don't need *Flipside!* The same is true of some of the paint programs now on the market. But if you need a utility to rotate and print wide display software, *Flipside!* does just that. It does what it was designed to do well and effortlessly and doesn't stretch or distort graphics.

Because the program supports multitasking, you can use it in tandem with other productivity software like a word processor, spreadsheet or paint program. Good utility programs have a way of creating a need for themselves, and *Flipside!* is no exception. The more you use the program, the more uses you will find for it. Special printout features which began as curiosities have a way of becoming necessities after you become familiar with them. I must confess I have lived for years without *Flipside!*, but it is a useful and powerful tool which does what it was designed to do very well. And like any American consumer, having once sampled the pleasures of new technological tricks, I'd just as soon not walk away from them.

The 38-page manual which comes with *Flipside!* is complete and includes a nice tutorial. But the intuitive design of the program negates the need for a manual at all. The program is not copy protected and can be installed on a hard disk drive. And as is true of all Micro-Systems' software, users are entitled to after-purchase support, including technical help by phone as well as by a 24-hour (BBS) bulletin board. ■



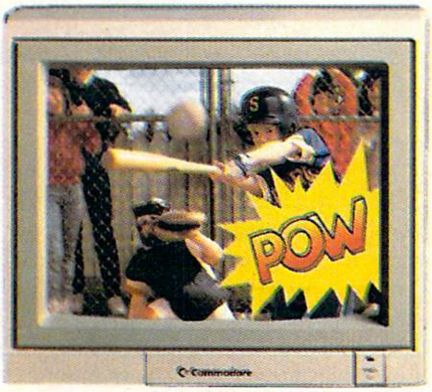
FADE IN COMPUTER-GENERATED TEAM LOGOS.



CHECKERBOARD WIPE REVEALS STAR PLAYER.



SUPERIMPOSED TITLES DISPLAY STATISTICS.



COMIC BOOK EFFECT POPS ONTO SCREEN.



ANIMATED BASEBALL FLIES TOWARD VIEWER.

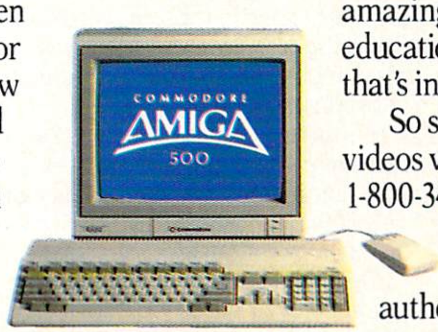


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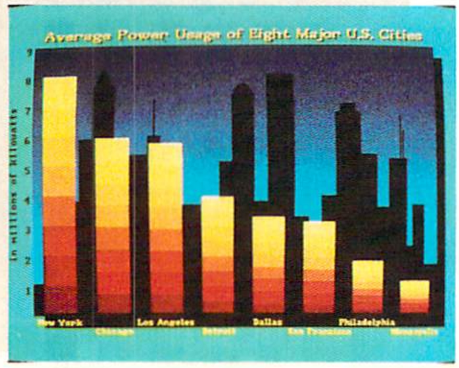
Only Amiga Makes It Possible.

Reviewed by Ervin Bobo

Deluxe Productions

Computer: Amiga (1MB)
Publisher: Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
Price: $199.95

You can edit any scene without disturbing or changing any of the other scenes using such options as cut, copy and paste.



In its broadest interpretation desktop publishing began with the introduction of *Print Shop* and in the past four to five years has grown so steadily in sophistication that anyone can now produce a newsletter or typeset a book without leaving their home office.

By contrast, desktop video is only half the age of desktop publishing. Born with the first Amiga, it has already grown to the point where the video equivalents of newsletters and books can be produced by anyone with time and talent.

The difference is that the creation of (good) desktop videos requires a greater commitment of time and, in many cases, a higher degree of talent—not to mention the availability of some rather sophisticated software.

Enter *DeluxeProductions*, a younger brother of *DeluxeVideo* both from Electronic Arts. While it may lack something in sophistication, it makes up for it with the energy and simplicity of a new generation—perhaps to the point that those presently daunted by computer video production will find themselves a bit more open to the subject.

Requiring at least one megabyte of RAM in order to hold all the instructions you're likely to give it, *DeluxeProductions* boots up into a Workbench-like environment where pull-down menus and the mouse will do almost all the work for you.

The working screen consists of a title box where you'll also enter path and chain names to be used during playbacks of your video; a clipboard for temporary storage of objects; and the heart of the system—twelve boxes, each representing a scene and arranged in storyboard form.

To create a scene, you click on a scene box to make it active, add a picture for the background, add objects, add transition effects and you're done. The addition of these objects and transitions is almost as easy as the telling—the work involves no more than choosing the proper menu and making your selections.

As a more concrete example, let's take an almost step-by-step trip through the production of a weather map, using only the graphics included on the *DeluxeProductions* data disk. First, load a picture to be used as a background: in this case a map of the United States. Next, choose the method by which you wish this picture to appear on the screen: fade, wipe, dissolve or one of a dozen other methods.

Next, go to the Clip menu and choose a weather symbol clip such as a rain cloud, then return to the menu and select a path for the clip to follow. Now the background appears, and your clip is attached to the mouse pointer. Dragging it across the screen sets the path of its eventual entrance and clicking on the right mouse button sets it at a stopping point over Iowa.

Now return to the Clip menu and select the transition method for the clip: again you're choosing fades, wipes, dissolves and the like along with the method by which it will disappear. Since we're building a weather map, it's more likely we'd want to select another option to make it stay in place while we build up the scene.

Following this, you'd go to scene two and essentially repeat the above steps to add a sunshine symbol to New Mexico. During this process you haven't touched the keyboard, yet coded instructions have been appearing in the scene boxes and have also been arranging themselves in a file (in RAM) from which you may eventually print out a text script.

Further, much in the manner of a good word processor, you can edit any scene at any time without disturbing or changing any of the other scenes using such options as cut, copy and paste.

Besides the megabyte of RAM, there are a few other things you'll need to make the most effective use of *DeluxeProductions*: a second disk drive is almost mandatory, for the program uses that extra RAM only to store instructions and path directions. When a picture or clip is called for in the script, the script knows where to go to get it, but the disk containing the picture or clip must be ready.

Preplanning is also a necessity: decide in advance what pictures and clips you'll want to use in your production and copy them all onto a single data disk before beginning. This will eliminate a lot of disk swapping. Ideally, the same disk that holds your graphics will have enough free space to hold the script you eventually create. (Note that *DeluxeProductions* has no means of *creating* graphics. For that, you'll need a paint program able to store images in the IFF format.)

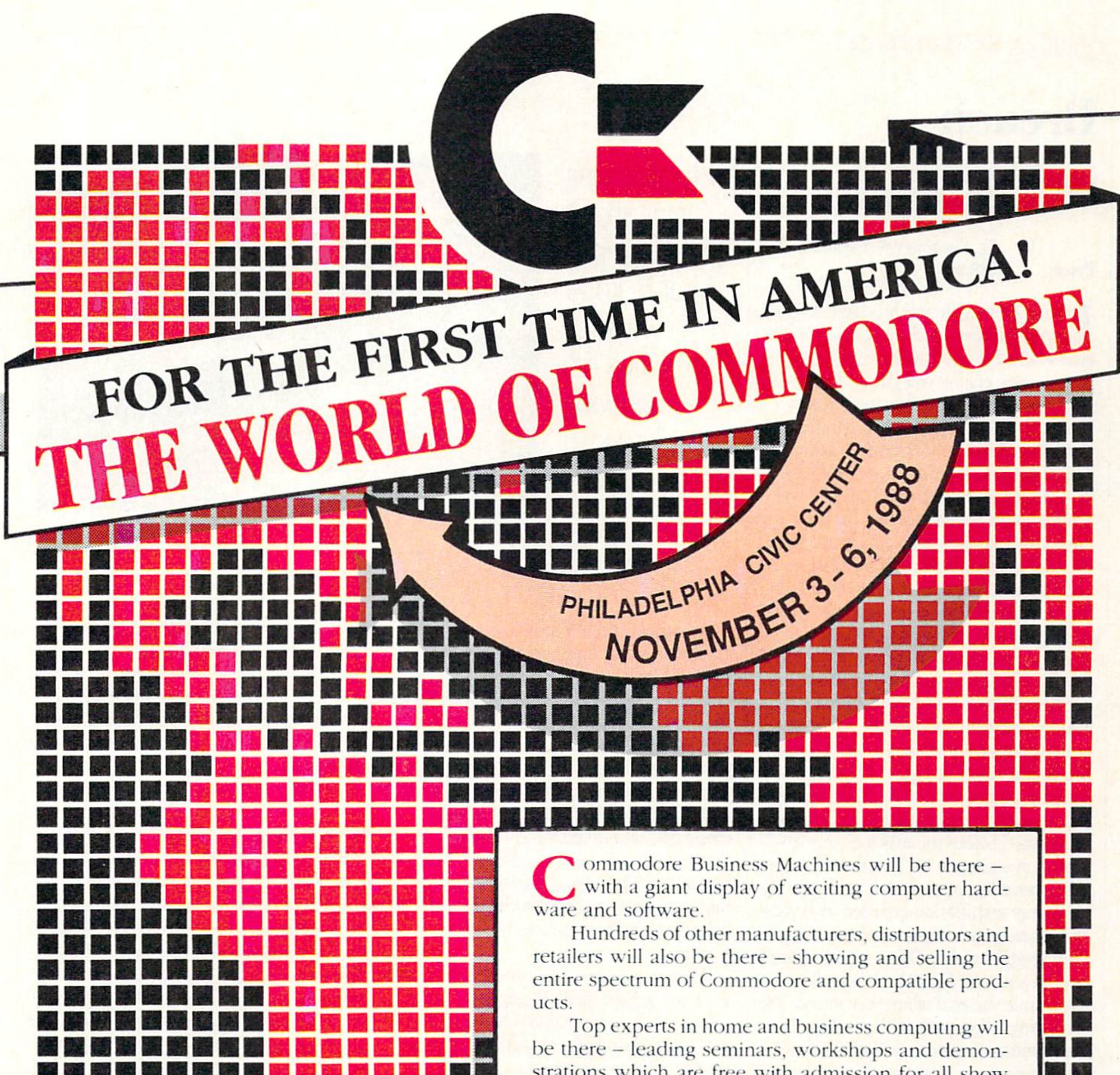
For the serious user, such as TV stations or businesses making heavy use of presentation graphics, I'd further suggest the use of a hard disk of ten megabytes or more: *DeluxeProductions* itself consists of four copyable disks (two are art disks) and can be installed on a hard drive. And while the short videos you may create for inclusion in home video movies or as a continuous-play loop will usually fit on a single floppy, longer videos and chained videos will require more storage space.

Twelve scenes are not the limit of *DeluxeProductions*, but only the limit of a single file. For longer productions, files may be chained to the limit of your storage space. While you probably won't attempt to produce a video version of *Gone With the Wind*, it's rather nice to know you can produce to the length that you or your client requires.

However, there are limitations to what can be done with *DeluxeProductions*. There is no provision for sound, although if you're producing for output to videotape, sound could be dubbed in after the fact.

Secondly, the animation effects are rudimentary: you may move a cartoon-type

Continued on page 39

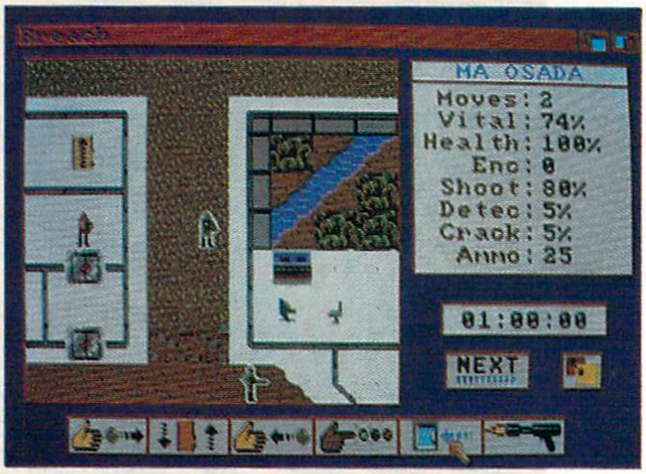

FOR THE FIRST TIME IN AMERICA!
THE WORLD OF COMMODORE
PHILADELPHIA CIVIC CENTER
NOVEMBER 3-6, 1988

Reviewed by Steve King

Breach

Computer: Amiga
Publisher: Omnitrend Software
P.O. Box 733
W. Simsbury, CT 06092
Price: $39.95

In planning your attack strategy, it is vital to know which marines are carrying special objects.



If your lifelong dream has been to jump into the future, lead a squad of Federated World Special Forces, rescue datapacks, crack enemy computer installations and blow enemy marines, aliens, beasts, warlords and robots to smithereens, then *Breach* is the perfect game for you. If not, you'll probably enjoy it anyway. Although touted as a tactical level combat game for one person, *Breach* plays more like a fantasy-type adventure with primary emphasis on military tactics.

In *Breach,* you play the role of a squad leader in the FWSF, commanding up to 19 marines. Each marine has special talents and abilities. Some are better shots than others, some are scouts, while others are experts at cracking into the enemy's computer systems to obtain vital information.

The game itself is comprised of a number of unrelated scenarios. About ten are included on the game disk. Each scenario has a specific mission which must be accomplished before the allotted time expires. For example, in "Breeder," the simplest scenario, your mission is to wipe out an enemy installation guarded by beasts and rescue your citizens who are being used as guinea pigs. Other scenarios may require you to simply eliminate the enemy, while the goal of another may call for retrieving a datapack without regard to the number of enemies killed. As the game progresses, you can always check your status to see how you're doing. The ultimate goal, however, is to improve the status of your squad leader as he is used in each scenario you play.

When you first start *Breach* you choose a scenario, a squad leader (a file on disk with the attributes of your leader) and the name of the game to save everything to. The disk comes with one squad leader on it, but once you start a scenario, this file is eliminated. If your squad leader is killed during the game the scenario ends, and you have to use an accompanying program to create a new squad leader. Once you have completed your housekeeping, the game begins. The main window on the screen is the Combat Window which represents a 9 × 9 square portion of the entire playfield. The scenery looks like most other war games and includes water, grass, walls, etc.

There are some differences, however, as the playfield contains both exterior and interior locations. Moreover, the playfield is multi-level once you reach interior locations. For example, a building can contain up to five floors which are accessed by dropshafts and liftshafts. By clicking on the change scale icon, the display changes into a 21 × 21 square display of the surrounding area, represented by colored blocks rather than discreet terrain squares.

All of your marines enter through a single entry square in a staging area carrying only their armor and a weapon. You will usually find other weapons (such as grenades, demo charges and rocket launchers) here which your marines can pick up, carry and eventually use, although the more they carry, the more desirable they become as targets. The active marine is always at the center of the Combat Window. You can switch marines by clicking on the Next icon; if you want to move to a particular marine, point the mouse at him and click the button while holding down the ALT key. To the right of the Combat Window is the Marine Statistics Window. This provides information on the selected marine (such as his type, remaining movement points, health, vitality, and abilities).

Each marine has a certain number of movement points, (which actually are activity points). They vary from turn to turn depending on how much he is carrying and how healthy and vital he is. You move a marine simply by pointing to the square you want him to end up at and clicking the mouse button. The marines are small animated men which actually walk to the designated square. Certain areas (such as heavy vegetation and stun fields) use up more movement points than dirt or grass. You can switch from marine to marine at will as well as return to a previously-moved marine and move him again, provided he still has movement points left. Activities as well as movement use up movement points. For example, it takes three points to fire your blaster and one point to pick up or drop an object. The Detector, a type of radar, uses 15 points. Once you have completed your turn, you click on the Next icon while holding the SHIFT key to move to the Enemy phase. At this time, the enemy (controlled by the computer) will move and attack after which it is again your turn.

In planning your attack strategy, it is vital to know which marines are carrying special objects. To find out you can either keep a written list or click on the Use Object icon which will display a list of what your selected marine is carrying. If you want him to use it, click "use." If not, you can cancel. Other than a blaster which each marine carries, there are grenades which destroy a 3 × 3 area targeted with the mouse. Rockets must be used with a launcher and also destroy a 3 × 3 square area. Demo charges are the most lethal as they cover a 5 × 5 pattern, the center of

which is your marine who sets it off when his turn is over. When using a demo charge, make sure your marine has sufficient movement points to escape and that there are no other friendly forces in that 5 × 5 area. These charges, as well as rockets, are good to blow up buildings and walls as well as the enemy. Aside from weapons, there are numerous other useful objects. Shields, which are dropped, block enemy fire. Grav Belts carry marines over most terrain, although if you run out of points over water, you'll drop in and drown. There are also Medikits and Stimulants which raise the marines' health and vitality factors.

You must carefully place your men at the end of your turn, since in most instances the enemy will be "off screen" and not visible. As the enemy also has grenades and rockets, a cluster of your men could easily be wiped out by a rocket. When inside make sure that your marines have enough points to move off of shafts when they reach the desired floor. If not, the shaft will block the movement of your other marines. Moreover, a particular marine may reach a level with no movement points remaining only to find it filled with enemy troops—certain death during the subsequent enemy phase. By the way, if you hear a digitized scream while one of your marines is using a shaft, it means that you have crushed to death an enemy who happened to be lurking in that shaft.

You should save your game quite often as the sudden and unexpected death of your squad leader will end the scenario, and this seems to happen quite frequently. Each scenario is a learning experience as the initial placement of the objects and the enemy is the same each time you play. Hopefully, you'll learn where all the traps are and where the needed objects are hidden. Moving through the maze-like multilevel buildings searching for your prey is not that easy and often becomes quite exciting (which, by the way, brings me to what I consider the best part of the game).

A second program is included called Scenario Builder. As its name suggests, it permits you to design your own scenarios, using up to 20 marines, 40 opponents, five levels and 30 objects. It is quite simple to lay out terrain. By using the mouse, you click on the icon representing the terrain (interior and exterior) you want and then "paint the map." Placing the enemy and objects is just as easy. You then select your marines and their specialties and create a squad leader. Finally, you set the victory conditions and you're ready to play. By the way, this part of the Scenario Builder must be used to create a new squad leader if yours has been killed in any of the games. I have designed the most bizarre scenarios, such as four small islands separated by a long trail of stepping stones. I have placed my marines on diagonally-facing unconnected islands, while the enemy is on the other two. An exit point was placed on one of the enemy's islands, and the object was for my men simply to escape. It is often a matter of trial and error to formulate a game which is not too easy or too difficult, but obviously such a game must be well thought out and takes time to design. You can also purchase additional scenario disks directly from Omnitrend such as The Serayachi Campaign, sixteen related scenarios which should be played in a designated order.

Although *Breach* is an addictive game, it does have some drawbacks. It doesn't appear to be a true Amiga game. In fact, the Amiga computer is not even mentioned in the instruction manual. It does not make the best use of the graphic powers of the Amiga. Although digitized sounds are utilized, they are few in number. For example, when anyone is killed, a lone scream emanates from your speaker. And the scream is the same for a marine as it is for an alien beast or robot!

The manual is quite thorough and instructive, but omits illustrations of the various objects and enemy icons. I suggest that before playing the game, you proceed to the Scenario Builder where you can see square by square and object by object what everything is.

Finally, since your squad leader is killed so often, Omnitrend could have automatically created a new squad leader at that point rather than making you to go through the tedious process of running another program to do it.

With these few limitations in mind, however, I enjoyed playing *Breach*, as it combined the best parts of a war, adventure and fantasy game into one program. It's fast moving and doesn't bog down like many other war games. The scenarios—especially the ones you can create—are not impossible to play or solve. The more victorious you are, the better your squad leader becomes. And if he reaches a certain success level, he will be considered for advanced STAR team training. I'm not sure that I'll ever get that far, so perhaps I'll set my sight a bit lower and derive my pleasure from blasting those nasty beasts. C

Software Reviews/DeluxeProductions

Continued from page 36

character onto the screen or all over the screen and even employ color cycling, but essentially he is still a static figure with no movement possible for arms or legs.

> For the serious user I'd further suggest the use of a hard disk of ten megabytes or more.

Third, although the duration of pictures and clips on screen can be controlled within certain limits, the mechanics of disk access to retrieve those pictures will interfere with precise timing. On the other hand, if output is to be to studio-grade video recorders, the use of single framing will correct this. For home VCR's, judicious use of the pause control will help.

In outputting to videotape, you have the advantage of working in high resolution (as dense as 672 × 444 pixels), as well as video overscan, which fills even the edges and corners of your screen just like a real TV image.

As important as hi-res and overscan are fonts that are still readable after the quality of your picture has been degraded, first by transfer to videotape and second by the probability that the tape will be played back through a conventional TV. *DeluxeProductions* addresses this by providing several new fonts that can be loaded in *DeluxePaint II* and used there to create the necessary titles and legends, which are then saved as clips for later use in your videos.

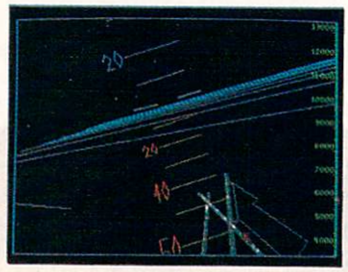
Documentation is very good, consisting of a 140-page ring-bound book (which lays open flat on your desk) and a quick-reference guide to the 40 transitional devices. Even for those new to the subject of desktop video, it should be easy to understand. For those who are familiar with the basics of desktop video, it is possible to create videos without ever reading the book.

DeluxeProductions will be worthwhile to three broad groups: TV or cable broadcasting stations that can't afford the more costly video graphics generators; businesses that wish to promote a product or service by creating their own TV commercials or looped videos for point of sale or trade shows; and amateurs who wish to perk up home video movies with the addition of titles or segments to help segue between the beach party in '86 and Thanksgiving in '87. C

Reviewed by Ervin Bobo

Jet

Computer: Amiga
Publisher: SubLogic Corp.
501 Kenyon Rd.
Champaign, IL 61820
Price: $49.95



In combat, especially in the air, the Amiga sound machine is working at peak performance.



The long wait is over: *Jet* for the Amiga is finally here. For those of you who don't know how long the wait was, I'll point out that at the introduction of the Amiga there was an unfinished program called "Radar Raiders," which SubLogic supplied as a demonstration and later decided not to complete. There were promises, however, that many of the dazzling routines of Raiders would eventually be incorporated into *Jet,* and those promises have been fulfilled in spades: not only is *Jet* dazzling, it may be more than you can handle.

Jet includes the option to fly an F-18 Hornet from the deck of an aircraft carrier or fly an F-16 Fighting Falcon from a land base. The missions allow you to fly either aircraft against air-to-air or air-to-ground targets (with one combined mission for the F-16), and after selecting the mission you choose one of ten difficulty levels.

For air targets you'll arm yourself with Sparrow and Sidewinder missiles, and for ground targets you'll use MK-82 bombs or Maverick missiles. Once past these opening menus, the superior graphics and sound of the Amiga take full charge, making *Jet* the closest thing yet to the flight simulators used by real pilots.

To begin with, all ground and target objects are solid, 3D objects with both color and shading. Enemy aircraft are also solid objects that look so real it is almost disturbing. On one of my early flights, I was attempting to land at what I thought was my base airport, and as I was lining up for the approach four MiGs rose to meet me. *Disturbing* is a good word, and *elation* is another good one: I've seen no other flight simulator offer such a realistic routine.

The cockpit view at default is almost spartan compared to other simulators, but a closer look will show that it gives you almost everything you need. A vertical gauge at screen right indicates your speed in Mach numbers while a similar gauge at screen left shows your altitude. At the top border of the windscreen are indicators to tell you the position of your landing gear, fuel remaining, missile lock, enemy alert, ADF and DME. Also shown here are the number of planes remaining to you as well as your difficulty level and your score. (For the first time, SubLogic has adapted arcade scoring and bonus points.)

At the bottom margin of the screen you'll see a display of your active weapons as well as numbers pertaining to frame load (Gs), fuel remaining, thrust and throttle, compass and a clock. What remains is a large, almost square viewscreen which will give you an uncluttered look at your battle area.

Within this viewscreen, however, there is a potential for pop-up windows. As with the main display, these windows hold 3D views and unlike the main display they can be re-sized. Pressing F3, for example, will open a window showing a map of the area you are flying over, while F4 opens a radar screen. Another option is the "missile-eye view" window: when a missile is fired, the 3D color display changes to an infra-red image of your target as seen by the approaching missile.

When you've taken as many hits as your aircraft can sustain it may be time to eject. You can watch the scenery as you drift down on your parachute, or you can bypass the routine and return directly to your base, assuming you still have other planes to fly. Your new craft will be fully armed and undamaged—but be aware that the enemy has been making progress during this interlude. You're still fighting the same scenario (sortie); the only thing that has changed is your aircraft. A sortie is complete when all immediate enemies have been dispatched resulting in bonus points.

In combat, especially in the air, the Amiga sound machine is working at peak performance. Always in the background is the whining throb of your jet engines and to this will be added the whoosh of launched rockets, the burping of your cannon (closer to the real thing than anything else I've heard) and—if you're good or lucky—the dull boom as an enemy blows up.

Jet also allows you to dogfight your friends via modem linkup. The built-in support is for a Hayes-compatible modem, and there are mouse-selectable routines for establishing baud rates and for dialing. Once the link has been made, the two craft will be deposited randomly in an area, and it is up to you to use the Auto Direction Finder and the Distance Measuring Equipment to locate your foe. Keep in mind that your friend is doing the same thing and that he who pounces first has the best chance of winning.

As with all other modes, the difficulty level chosen will determine the vulnerability of your craft as well as how forgiving it will be about bad landings. Modem foes can fly at different difficulty levels if they choose.

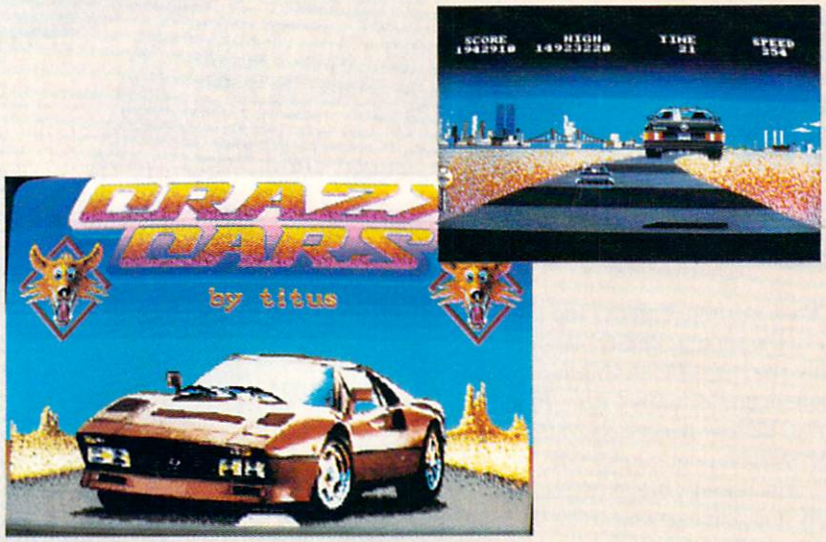
Jet's documentation is both clear and concise, with plenty of illustrations. There are also valuable sections on the tactics of dogfighting and of striking ground targets.

In summation, *Jet* has great graphics and sound, speed that's almost too hot to handle with enough missions to keep you busy for a long time as you try to earn the medals it will award. In the unlikely event that you do tire of missions, bear in mind that *Jet* is compatible with SubLogic scenery disks and the *Flight Simulator II* can also be used for scenery. ■

Reviewed by Jeffery Scott Hall

Crazy Cars

Computer: Amiga
Publisher: Titus Software
20432 Corisco Street
Chatsworth, CA 91311
Price: $39.95



You are strapped into a Porsche 911 Turbo going 165 mph across the Arizona desert. Just a few moments ago, you passed three of your toughest opponents on the most dangerous curve of the course. The wind in your hair and the warmth of the sun feel great, for you are in first place. As you crest the hill, you can see the finish line just a few hundred feet ahead. Congratulations, you have just won the honor of being one of the craziest cars on the road!

What I have just described is just one of the many challenges you will face in the new racing game *Crazy Cars* from Titus Software. The game starts out with a title picture from the game, while an electric guitar solo plays in the background. Press the fire button and the game will finish loading. Now, lets take a look at the sports car that you will be driving.

Your Challenge

The type of car in which you will be racing all depends upon how good a driver you are. Since you are just starting out, you will be forced to take one of the less expensive cars—the Mercedes 560 SEC. You will have to earn the right to move to a Porsche 911 Turbo, Lamborghini Countach or a Ferrari GTO by completing six different race courses, which is no simple task. The courses in which you will be racing are Florida, New York, Space Shuttle, Arizona, Malibu and Mountain.

Did I mention you would be racing the Space Shuttle? Well, not exactly, but close. You will be racing on the same road in which the Space Shuttle is occupied, and you can see the Space Shuttle from the road. How's that for a fantasy race? Each race course is presented in a different way, but each has the same feel. The scenery does change, however; this keeps you from getting bored racing on the same course. OK, hotshot, here's your chance to be the number one crazy driver!

Just Cruising?

When you are starting a new course, the name will appear in the middle of the screen, just press the fire button to start racing. Your car will appear at the starting line. Your goal is to cross the finish line before your timer reaches zero. Sounds simple enough right? Wrong! Your competitors are not amateurs; they will try to complete the course in less time than you, and if it means running you off the road, just call them crazy.

Your competitors will try to complete the course in less time than you, even if it means running you off the road.

The type of car you have will determine your top speed and your handling. When you accelerate by moving the joystick up, the tires will squeal, the engine will roar, and the road will scroll. As you are traveling along the route, the scenery in the background will get closer, as if you were actually driving along that road. Also, you will find the road to be very realistic. For example, if you take a hill going over 100 mph your car will appear to take flight, skipping some of the road and landing with a screech. These effects are very good, providing a realistic driving feel.

When you cross the finish line, you will be rewarded bonus points with any time remaining. Then you will be taken to the next racing course. If you have completed all six courses, the type of car you will drive changes. The game ends when you have run out of time before completing the racing course. When this happens, you will be shown a junk yard of crashed cars (perhaps those who were a little *too* crazy) while birds chirp in the background. Just how crazy are you?

Are You the Craziest?

To win the game, you must become the number one crazy driver. This is done by completing all six race courses four times. If you are fortunate enough to do this, you will be labeled the number one crazy driver. However, if you are not quite that lucky, then perhaps you will fall in the top 150 craziest drivers. When you are in one of the above categories, you will be able to enter your initials to save your spot in the top crazy drivers.

Comments

I have only one major complaint with the game, which is that there are no markings on the road (i.e., no passing zones, dividing lines, etc.). I felt this detracted somewhat from the design and "feel" of the road. Another complaint I have is that no pause functions were included in the game. Even though this might be minor, it would be much better if these were included. Despite these criticisms, I have had a lot of fun playing this racing game. *Crazy Cars* is a very realistic arcade-type racing game with good graphics, sound and music to keep you coming back for another crazy drive.

Reviewed by John Pustai

Quick Brown Box

Computer: Commodore 64 and 128
Manufacturer: Brown Boxes, Inc.
26 Concord Rd.
Bedford, MA 01730
Medium: Cartridge
Price: $129.00

"The Cartridge Family" (no relation to the singing family sitcom) is probably the best title for this success story, where bigger is really better. In fact, this latest battery-backed RAM family member weighs in at a hefty 64K. It's previously announced siblings include the 8K, 16K and 32K versions. Like the rest of the family, the 64K version had clamorings from the marketplace for its birth. And because of great planned parenting, this newest arrival has even more personality and potential than other family members.

Its personality is defined by the whopping 64K of battery-backed RAM. There is plenty of space to save home-grown programs, without worrying about sudden power outages. But its potential is in its ability to save or load an entire series of programs—a "box" of programs—in one operation. These programs are saved as one lone sequential file.

Think of it. You have a series of programs that you will be using over the next two days. You load the entire collection of programs into the cartridge. Then, when you power up again and again, the programs load instantly—and even automatically if you wish—without disk drive hassle. In essence, it's like having a 64K permanent RAMdisk.

When finished using the first collection of programs, you simply save the entire collection as a unit with one command. Then depending on your mood, you'll create a "Utilities Box," "Game Collection Box," "Educational Box," or reload in one shot any other customized program collection. The constant hassle of loading separate programs is eliminated.

With the cartridge in the game port, a directory of contents is displayed on the screen every time the computer is turned on. Resetting the cartridge displays this directory. At initial power-up the computer is still in the normal BASIC mode. However, if you want to run one of the cartridge programs, you need only to type in an asterisk and the two-character program identification code shown in the directory.



ART BAXTER

On-screen instructions are detailed, exacting and correct, preventing user frustration.

Identity of Its Own

Because of its personality and potential, the 64K has an identity of its own. Built into a classic game-style cartridge, the 64K Quick Brown Box (QBB) comes with a 160 milliampere-hour, 3-volt lithium battery, yielding an expected seven- to ten-year storage capacity. With the computer on, there is no battery drain. When the cartridge is unplugged, there is only a one microampere drain needed to hold information in the CMOS (complementary metal oxide semiconductor) memory.

There are four 16K banks of CMOS memory. Only one bank is used at a time. And all banks use the same address location—the usual cartridge position of 32768 ($8000 Hexidecimal) and to 49151 ($BFFF Hexidecimal). Selection of the correct bank is made by program bits at 56832 ($DE00). A reset button and a 64/128 mode slide switch enables control from the cartridge face.

Several utilities are contained in the purchased QBB cartridge RAM. These utilities include a loader, a Supermon + 64 (by permission from Jim Butterfield), and an auto-boot program, a separate manager program for each of the 64 and 128 environments, a check-sum program and cartridge checker program.

All of these utilities are saved to disk before any other use is made of the cartridge. Saving the entire "box" is accomplished in one step, and the contents are saved in a sequential file. Then, if needed, the entire original collection can be reloaded in one step. However, for convenience, the utilities files should be saved separately, so that other customized boxes can be made using these separate files.

Cartridge Management

Of all the utilities, the Manager program is the most useful. The Manager simplifies program storage, lists the programs in the QBB directory, enables easy program loading with three keystrokes, allows viewing the QBB directory and the

disk directory, and enables loading or saving programs between the disk and the QBB. In addition, the Manager can set up any program to auto-start, give the amount of memory—in disk blocks—that each program will occupy, link programs, and initialize (empty) the QBB for new material to be stored.

A "Partition" option in the Manager allows you to set aside one or two 16K memory banks for your own data or programming, using the QBB as a RAMdisk. In this configuration, programmers can immediately save their programs to the non-volatile QBB, without saving their program to disk first. Programmers will soon discover that procedures for use of the QBB as a RAMdisk are not the same as the RAM DOS procedures that control the Commodore RAM expansion units. The RAMdisk option is chosen when the QBB is initialized. In this option, the Manager will not load programs into the partitioned bank.

On-screen instructions to load and save programs are detailed, exacting and correct, preventing user frustration.

A new feature has also been added to the Manager program—the ability to change the program name, load address, entry address (64 mode), and which memory banks it will use (128 mode) of any program saved in the Box. Still another nice feature is the ability to save the entire QBB contents before you initialize and add another collection of programs.

There are a couple of items that must be clarified for proper loading of files. First, the Manager program will load only program files, not sequential or data files. In fact, there are no utilities yet that will load data files. Secondly, a total "Box" is a sequential file, and is loaded only with the QBB loader program.

RAM Expansion Compatibility

Compatibility with Commodore RAM expansion units and use with cartridge port expanders is a welcome feature. The QBB was designed to be compatible and used simultaneously with the Commodore 1700, 1750 and 1764 RAM Expansion units in cartridge extender cards. Because these Commodore units use $DF00 as their control address, no control commands will interact.

Again, some caution must be taken. When using the QBB in an extender card, it is not a good idea to leave the QBB turned off, when the computer itself is turned on. This condition results in a 25-fold increase in the battery drain. Also, be sure to back up the "box" contents before using the cartridge simultaneously with another cartridge. In this dual-cartridge operating mode, there is a risk of altering the QBB contents, although permanent device damage has never been exhibited.

In order to maximize productivity of the dual-cartridge Commodore RAM/QBB operation, it is best to keep the Commodore RAM DOS emulation program in the QBB cartridge. Storage of the RAM DOS in the QBB will eliminate the potential loss of the link between RAM DOS and the computer. Even though you don't lose the contents of the expansion cartridge until you turn off the power, it can be a nuisance to reload the RAM DOS program in order to re-install the drive emulation for use with the Commodore RAM. However, with the Commodore RAM DOS program in the QBB, this reloading need is eliminated.

Applications

In addition to the above sample of on-board and user-developed applications, users can be wildly creative with the QBB applications. For example, Brown Boxes, Inc. has developed a nice Rolodex program that allows alphabetic entry of six-line business information. They intend to make this available to QBB users.

Still another application example is of a young bulletin board entrepreneur, who sells advertising space on his in-school 64 to fellow high school students. He enters their messages in the QBB, preventing potential damage to a disk drive sitting in a cafeteria environment.

A Maine restauranteur compiled a BASIC waitress-order and daily inventory program in the QBB. His motivation for using the QBB was to avoid electrical line transients that have played havoc in his previous non-QBB system. Now his business program reboots automatically after every power outage.

Another use is to develop a good directory utility collection or "box" that would include programs that scroll through directories, read sequential files to screen or printer, scratch files, or load programs in either BASIC or machine language. Still another application is the ability to load unprotected software into the cartridge. Most unprotected software—such as *PaperClip III* (without the default file) and *The Write Stuff* word processors—will load and run in the QBB.

In the case of *The Write Stuff,* there is a special version that works especially with the QBB. Everything that is typed is automatically saved in the QBB, and will be automatically visible five seconds after power up. Defaults can be customized to the user's needs and saved in the QBB. Macros can be defined and saved in the cartridge.

Based on their working success with *The Write Stuff* publisher, Brown Boxes, Inc. is working with other software vendors to modify their software to use the QBB as a non-volatile data or text buffer, as well as an additional memory area. Brown Boxes is not ruling out game software in their discussions with various vendors.

Commercial software is not always in contention with the QBB. In fact, many programs which use large quantities of memory, switch out BASIC ROM when ready to run. In this case, they are also switching out the QBB, allowing the QBB and the software to coexist. As a worst case scenario, users can always use the mode switch (64/128) switching out the QBB.

Deleting programs was instantaneous and extremely easy—you could delete files as fast as you could type the three-letter code.

Evaluation

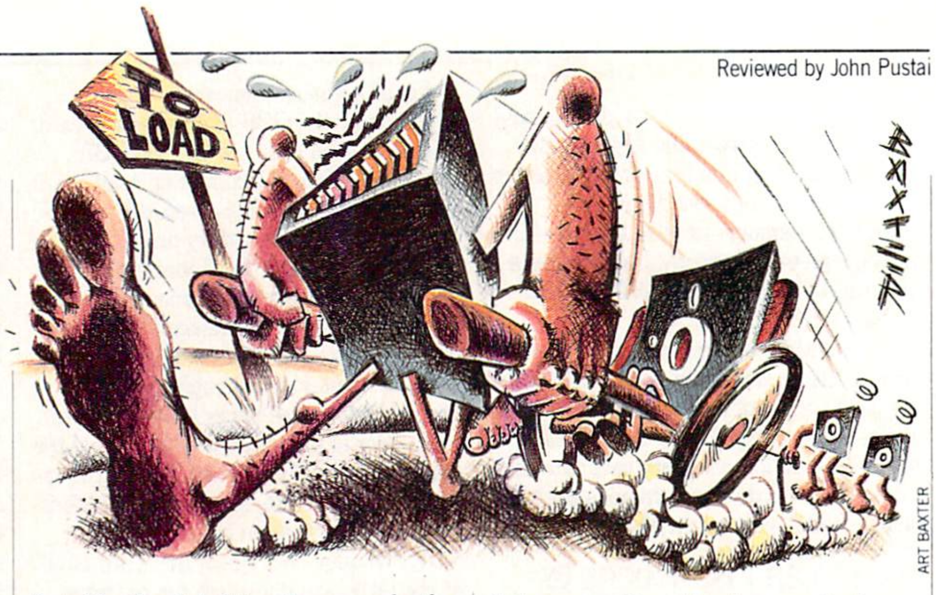
My evaluation of the QBB included a full test drive. I found that one of the nice features is the speed of operation. Deleting programs was instantaneous and extremely easy—one letter to call up the delete command, and two letters to indicate which program was deleted from the cartridge. No RETURN was needed. In fact, you could delete files as fast as you could type the three-letter code.

Using the two-key commands to load programs from the box was easy and convenient. The prompts for saving the entire box were also easy, again eliminating the need to press RETURN. On-screen instructions to load and save programs are detailed, exacting and correct, preventing user frustration.

Another nice feature is the display of the number of disk blocks that each program in the Brown Box will occupy. This

Continued on page 45

Reviewed by John Pustai



ART BAXTER

Warp Speed

Computer: Commodore 64 and 128
Publisher: Cinemaware Corporation
41654 Thousand Oaks Blvd.
Westlake Village, CA 91362
Medium: Cartridge
Price: $49.95

Warp Speed is not only the catchy title of this fast-load utility cartridge, but also the best description of just how fast this cartridge will become successful. Commodore 64 and 128 users will probably leave this cartridge in the expansion port permanently, because of the capabilities that include a fast-loader, a DOS wedge, a sector-editor, a machine language monitor/assembler, file utilities, and drive renumbering. Even more amazing is one application for a 64/1571 disk drive system that will put a Cheshire cat smile on user's faces.

Fast Loading

Before we get to the "Gee whizzery," it's probably safe to say that *Warp Speed* functions work identically on the 64 and 128 in both 40- and 80-column modes (128 only). Compatibility with disk drives is another plus. In addition to working with the 1541 and 1571 drives, the cartridge works with the new Commodore 1581 floppy drive, the new hard disk drives (from various manufacturers), and the MSD dual drive.

Use of the cartridge with any system configuration is straightforward. Once the computer is initially powered up in BASIC, the simple cartridge commands allow rapid loading of commercial or user-written programs. The routines will work with any application which uses Kernal load and save routines, but not the Kernal restore routine—which resets the vectors to their default values.

The cartridge is fully compatible with most commercial software. Commercial software with "normal" copy protection will load about four times faster. And *Warp Speed* also works with many heavily protected programs that are usually incompatible with other cartridge utilities. However, some of these heavily protected programs (less than 1%) have special cartridge detect codes that prevent the fast-load capability.

Fast loading of commercial software, and even home-grown software, is also affected by the disk drive. For example, the 1571 drive saves information in a format that is able to read data faster than a 1541, allowing the *Warp Speed* cartridge to load the software ten times faster than normal. *Warp Speed* also allows the 64 to use the 1581 drive.

Expanded DOS Wedge

In addition to the fast load capabilities, there is a full complement of DOS commands—including accessing of the drive command channel, saving and verifying files. All of these functions are possible with easy notation, rather than the BASIC commands.

Easy notation is also available for many new commands that are built into the cartridge. One such command is Type File, which enables the listing of any normal text file to the screen. A simple ampersand (&) followed by the filename will load the text file on the screen. There is even a Print Screen feature, which can be combined with Type File to print such items as the "README.DOC" files that come with many public domain programs.

Still another new command—the Menu-formatted Directory—allows the user to display the directory in a menu format, enabling programs or files to be automatically loaded with the cursor and RETURN keys. There is even the ability—when in BASIC—to turn the cartridge fast-access routines "on" or "off." Software control of the disk drive number is also possible.

Impressive Storage

If you're impressed with the software control of the disk drive number, you'll be amazed with this next application. Commodore 64 users who have 1571 disk drives will buy this cartridge just for the ability to access a whopping 1328 blocks of disk space without flipping over their disks. Once the disk is double-sided formatted, files are stored and retrieved without any disk removal from the drive. In other words, it is just like having a single 1541 disk, but with twice the storage space—1328 blocks of storage.

Setting up this 1328-block storage is easily accomplished while still in BASIC by first commanding the 64/1571 system to use the 1571 in a double-sided mode. In this mode both sides of the disk are formatted without removing the disk from the drive. Only one BAM is used for both sides of the disk.

In testing out this technique it seemed best to toggle back into the single-sided mode while "loading" files from other single-sided disks. Next, it is best to re-toggle back into the double-sided mode for "saving" the files on the double-sided formatted disk. The "arrow-up" key and either "D" or "S" combines for the toggling between the double-sided or single-sided disk use.

The double-sided mode also improves the speed of scratching and validating files. However, when loading most copy-protected software, the double-sided mode should not be used. In all cases when moving in and out of the double-sided and single-sided mode, care must be taken to ensure that the correct sides are formatted.

Utilities Abound

Moving out of BASIC and into either the sector editor, the machine language monitor, the file utility or the copying program is easily accomplished with the typing of a pound sign (#) to activate the menu. Returning to the main menu from any of the sub-menus is as easy as pressing "Q."

The sector editor is for editing data or program files directly on disk. Any sector

on any track can be edited—either by changing the hexidecimal code, or by making actual changes to the text in that sector. The new sector can then be written back out to disk.

Working in the sector editor is extremely easy. Both the hexidecimal and text version of the sector are shown on the screen. A simple plus (+) or minus (−) displays the next higher or lower sector. The SHIFT key—in combination with the plus or minus sign—moves up or down one track. Printing the entire sector (both hexidecimal and text) is completed by pressing "P."

Commercial software with "normal" copy protection will load about four times faster.

Saving the new edited version of the sector to the same disk drive, or a second target drive, is again done with one keystroke. Both the source and target drive numbers are shown on the screen. And these drive numbers can be changed in any combination. One keystroke also moves the program between the sector editor and the machine language monitor. Sectors can be copied from one disk to another.

Warp Speed's machine language monitor is probably one of the most advanced ever produced, yet it uses the syntax of most previous monitors. All the usual sections are available—the program counter, status register, the three data registers and the stack pointer. Also, there is an IRQ indication that tells to what address the computer will go if an interrupt occurs.

Within the machine language monitor, files can be completely disassembled by indicating starting and stopping address. Areas of memory can be compared, indicating the addresses at which the memory locations are different. Blocks of memory can be filled in with constant values. Also, there is a hunt command that gives all the addresses having specifically sought-after contents.

The monitor has the ability to transfer blocks of code from one memory location to another. And blocks of memory can be transferred to and from disk drive memory. As in the screen editor, all screen information can be dumped to a printer. Programs are easily assembled, loaded, saved or verified, all while in the machine language monitor.

Next on the menu is a file utilities section, which allows files to be copied or scratched. Within this feature source and target drives can be set, programs can be auto-loaded using the disk directory automenu feature, and drive commands can be used.

Finally, disks can be copied, using either one or two separate drives, or a two-drive unit (dual copier mode). The single copier routine also verifies both the source and target disks for bad sectors. And, the single copier compresses the data during the read process, permitting the copying of the complete disk in fewer passes. If a 1571 drive is used, double-sided disks can be copied.

There are some other commendable attributes of this cartridge. First, the cartridge is the size of a normal game cartridge. For convenience, there is a reset button, and a 64/128 mode switch placed on the cartridge face. Secondly, the cost has been kept minimal because of clever programming. Cinemaware acknowledged that all of the capabilities of the cartridge started out as 32K of machine language code. However, this program was rewritten over and over to fit into the 16K ROM chip in the game-size cartridge.

What is not commendable, however, is that it seems the publishers also compressed the user's manual to half the size it should be. In this case, what results is a manual that is not clearly written. Because of the difficulty in the manual organization and explanation, users will find a greater-than-usual amount of trial-and-error necessary to work through some of the command structures.

Some problems result from this manual deficiency. For example, there is nothing in the manual that indicates how to format a single-or double-sided disk. Correct command structures are misleading—some require the use of quotation marks, some don't. The copy command automatically formats the disk, but does not format double-sided disks, even if you toggle "Double" in the sub-menu. In the File Utilities, it is unclear exactly how to copy the file.

With a little effort, Cinemaware could reorganize and revise the entire manual. They should add step-by-step examples and be more exact in the listing of the command summaries. With this second manual revision, *Warp Speed* will race forward like the Rolls Royce engine that it is, and even look a little classier. ■

Hardware Reviews/Quick Brown Box

Continued from page 43

With the plethora of cartridge capabilities, there would be confusion except for the excellent, detailed and accurate manual.

comes in handy if you write a program and want to know whether or not it can be saved to a particular disk. You can easily jump from viewing the disk directory with the number of blocks available, to viewing the cartridge directory with its listing of the number of blocks needed.

However, there is a minor drawback that probably will never be noticed by most users. This is that the 64 and 128 program cannot be loaded into the box at the same time. Both types of programs have different Manager software.

Great Documentation

With the plethora of cartridge capabilities, there would be confusion except for the excellent, detailed and accurate manual. For computerists who have some understanding or interest in more than just games, the manual provides fundamental information about the technical aspects of the QBB use.

This fundamental information provides the understanding to the coding or programming use of the QBB. Details of memory location positions and what is happening with the registers are all given with clear description. The style of writing gives the fundamental operation first, the procedure second. Understanding the procedure is based on understanding the fundamental operation.

Chapters are organized clearly and topically. Even cross references are made to other paragraphs where needed to clarify information. However, a "first things first" section is needed. Brown Boxes, Inc. has realized this and provided it as an extra letter to the user. This letter should become the first page of future revisions of the manual.

Cartridge expander cards, utility cartridges and other cartridge RAM systems are becoming more prevalent in the 64/128 world. This 64K RAM cartridge is certainly at the top of the list, both in its technology and in its productivity capability. The next question might be, "What about a 128K version for an encore?" ■

by Mark Jordan

geoWrite 2.1


MIA BOSNA

It's time to take an inside look at ox number one in the GEOS yoke: *geoWrite 2.1*. (Ox number two is *geoPaint* and together they're pulling *geoPublish*. Contrived metaphor, yes, but it works.) Since *geoWrite* is a major player in the Commodore word processing software game, we need to give it a major look. So for the next two issues that's what'll happen.

Please, if you already own *geoWrite 2.1*, keep reading—there are tips and hard-to-find facts here. And if you don't have it yet, keep reading—this is a review (sort of). In fact, this article is for you if you fall into any of the following categories: you're a member of the Mormon Tabernacle Choir, you participated in Hands Across America, or you're left-handed. Or right-handed.

Still with me? Good.

GeoWrite's Place

First, let me say at the outset that I doubt I will ever use *geoWrite* to write my first novel (at the rate I'm going, I probably won't use any word processor to write my novel). It's just too slow. But that doesn't mean I don't use *geoWrite*, because I do—for specific word processing needs.

Like what, you wonder. Like a word processor processor. Let me explain. I often use *geoWrite* to dress up my documents after I've typed them using my old standby word processor. But that's not all. I also use *geoWrite* as a page processor, a test creator, a poster printer, and a resume writer. If I owned a restaurant I would definitely use *geoWrite* to create my menus. In sum, *geoWrite* is my software of choice for producing classy, sassy pages.

GeoWrite outshines other word processors because of two powerful attributes: fonts and WYSIWYG (What You See Is What You Get—pronounced "whizzy-wig").

Fonts are truly what make *geoWrite* worth owning and using. For the uninitiated, fonts are simply different print styles. *GeoWrite* has gobs of fonts with more on the way. You can even create your own. *GeoWrite* isn't the only word processor that allows you to use different fonts; what makes *geoWrite* special is the fact that the entire GEOS system is built around the bit-mapped screen concept.

With a bit-mapped screen you can see on the screen virtually what you'll see on paper including fonts, styles (like underlining, italics, etc.), and where each page begins and ends. Each little dot on your *geoWrite* screen will become a printed dot on your paper. This is where WYSIWYG comes into play. Of all the word processors for the Commodore 64/128, none show you on the screen as accurate a portrayal of what your paper will look like when printed as *geoWrite*. True, some can show underlining, bold and italics, but none display all these plus fonts of many different sizes plus proportional spacing. None, except *geoWrite*.

It's the bit-mapped, graphic environment that makes GEOS hum. Alas, this very strength is also GEOS' greatest liability: it is slower than the old character-based systems. But don't blame Berkeley for this: even the Amiga, with its powerful 68000 processor and bit blitter, seems slow in printing to the screen compared to a 64 program written in machine language. This is simply the price that must be paid to have a dot-by-dot display.

So, when I want to do something classy, something that stands out, I reach for *geoWrite*. And, thanks to the TextGrabber program, even when I have done a big project using my other word processor, I can convert it to *geoWrite* format and add the fine touches.

There, you have my perspective. Now let's start examining this sassy little filly. Er, ox.

Five Important *GeoWrite* Traits

Selecting Text: This concept is also sometimes called "highlighting." On other word processors it's known as ranging, blocking or marking text. The idea is the same on all of them: you are to designate an area of text that you want to perform some action on. The action could be to change the font or the margins, to delete the selected area or to move it. It's a crucial word processing concept, and *geoWrite* incorporates it in a friendly manner.

There are three ways to select text with *geoWrite:* 1) by moving the pointer to a starting spot and clicking, then moving to an ending spot and clicking; 2) by moving the pointer to a word you want to deal with individually and double-clicking; 3) by going to the Options menu and choosing "Select Page."

If you use "cut" or "copy" from the Edit menu, you'll be happy to note that the highlighted text is buffered. That means it's saved for future use. For instance, if you accidentally delete (cut) a big chunk of selected text, you can get it back easy enough with "paste" (also from Edit menu).

That's the good news. The bad news is that if you have selected a bunch of text and hit a key—any key—you will not only find that bunch of text gone, but you'll also find it is forgotten. Dead. R.I.P. Ask me if that makes a person sad. It does. Ask me if that makes a person angry. It does. Ask me if a person's equipment is able to stand many of these accidents. It isn't. Berkeley, change this. Please.

The Ruler: At the top of your screen you'll find, among other things, a Ruler. With it you can set margins, tabs, line spacing, justification, paragraph indent (or "outdent"), tabs, and decimal tabs. Very versatile, indeed. For instance, you can now have different Ruler settings for each paragraph you're typing. This allows you to indent special paragraphs, "outdent" others, single-space some, double-space others, and so on.

You may ask, but don't all word processors let you do these things? The answer is no. Many do. But very few do so as intuitively. Other programs often make you type in codes or use special menus to do what the Ruler does with a simple point and click.

For example, to choose line spacing simply click on the appropriate box. Unfortunately, there are only three choices: single-space, 1½-space, and double-space. But for most purposes, these three choices are plenty.

Changing the margins is just about as simple, but not quite. All you need to do is point at one of the two M's that are already in place then click, drag and re-click. It's very logical. The problem is that

Continued on page 88

TOLMAN

Bowditch

Stad. Bow.

Roma

Headline Fonts

Pumping GEOS

Hey, Berkeley, How 'bout . . .

While I'm happy with **geoWrite 2.1**, there are a couple things I like to see in future versions. First, a list of some changes I'd like.

1) When text is selected (highlighted), only the delete key or "cut" from the Edit menu should remove it. If any other key is pressed the text should un-select.
2) I wish the auto-scroll that occurs when you move your pointer to the very top or bottom of the screen could be localized to just a small area. It irks me when I move my mouse up to the Command menu to do something and the screen starts scrolling.
3) Please shut off the pointer once typing begins. It can remain off until mouse (or joystick) is moved.

There, that wasn't so bad. Now for some things I'd like to see added.

1) A keyboard shortcut to get to the top of the screen and document. How about this: pressing HOME moves you first to the top-left of screen and if pressed again to the top of the document.
2) A way to jump to the next screen (not page) without scrolling a line at a time.
3) A typeover mode. I really want this one. Auto-insert is great at times but it's slow. Why not allow an insertion of say five lines, then let the user enter text without insert mode being on.
4) A buffer for all deletes. I realize this may be a tall order, especially for 64 users, simply because of memory constraints. But it'd sure be nice.
5) A word counter. Writers like me who are told to "do it in 2000 words or less" need this feature.

GEOS 2.0 IS HERE

I just received a press release of the latest version of **GEOS** (64 only) from Berkeley SoftWorks. Here's a brief overview:

Enhanced versions of **GEOS**, **geoPaint**, **geoWrite Workshop**, and **geoSpell** will be part of the package. The **GEOS** enhancements include a faster copying system with less disk swaps, ability to recover the most recently deleted file, an accelerating mouse driver, and others.

geoPaint will now allow you to stretch, constrain, and scale graphic images (hurray!), stop pattern fills in progress (hurray again), create overlays (I need to investigate this one), add some graphic commands like connected lines (as in **geoPublish**), ellipses, and rectangles, etc. **geoSpell** will be faster, 38% faster. That's good news.

I'll keep you posted as details become available (and as soon as I get my hands on 2.0).

Writer Discovers: Side 2 Exists!

Attention: geoPublish users with C-128's and 1571's.

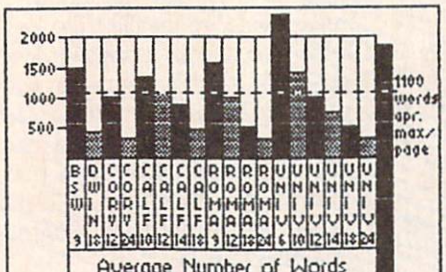
Don't despair that you are stuck in the **1541** mode. Just boot up **GEOS 128** first and load **geoPublish** in from there. Crucial: boot **GEOS 128** up in 40-column mode. Don't ask me why but this is very important.

Also, be sure you format your disks doublesided. This gives you a lot of ample space to do your **geoPublish**ing on just a single disk. Do the formatting from the **C-128** deskTop. Then copy the important files to each as directed below.

If you are using a two-drive **1571** system, put all the program files you need (**geoPublish, Photo Manager, 128 deskTop**, and all the fonts you can squeeze on) on one disk and use another for your text and graphic files and your geoPublish files.

Font Statistics (or How many words can you squeeze on one page?)

When using **geoWrite** and **geoPublish** it's often useful to know just how many words you can get in a given area. Since each font with its varying points gobbles up varying amounts of video real estate, it would take a Manhattan-sized phone book of data to chart all the possibilities. So I decided to simplify things.



Average Number of Words per page with 8" width

The graph centered here shows you how many words can be expected on a standard 8-1/2 by 11" sheet of paper using the default **GEOS** margins.

Vol 1, Num 2

New Graphic Adventures: Dondra and Jinxter

News and opinion from a leading explorer of those fantasy realms called adventure games.

Rick Incrocci, whose TV cartoon-style pictures made tough games like *Masquerade* and *Sherwood Forest* a joy to get stuck in, has always been my favorite computer artist. His latest "exhibit" is now on display in *Dondra,* the first in Spectrum Holobyte's projected series of "QuestMaster" adventures. You have been summoned to the land of Dondra by a telepathic message from the last of the wise men, whose people were being wiped out by an evil fiend, Colnar. Too late to save them, your immediate goal in this installment is to get your sticky hands on the Crystal Prism of Heheutotol and return it to your starting place.

Doing so demands more than mere puzzle-solving smarts, for many problems unfold in real-time: if you don't solve these quickly enough, you'll get wasted by a band of aliens or some other weird beings. It took me a couple of hours just to get out of the first room, for the game opens with a "locked room" puzzle that must be cracked before the quest actually commences. Beyond the door, I was gratified by a novel visual effect: several pictures of a skeleton, each larger and positioned at a different angle, quickly flashed on the screen to create the effect of "zooming in" on the fiend.

The scoring system is also unique. You get points for solving puzzles, and your final score also constitutes experience points that will be valuable in future games in the series. But your score is also affected by several factors: the number of times you get killed or save the game, the number of objects you collect, and the amount of time it takes you to solve the game. These factors are saved if you get killed and start over. But you're allowed to reset them to zero if you want a completely fresh start.

Dondra is available for the 64 and the Amiga (for which a specific set of graphics



SUSAN LIPPMAN

were created, the first of Incrocci's 16-bit work I've seen). The company doesn't know when the next game in the series will be ready, but I'll be ready when it is.

The Magnetic Scrolls On

Magnetic Scrolls, who did *The Pawn* and *Guild of Thieves,* have another well-illustrated and equally amusing adventure in *Jinxter.* Remember how your goal in *Pawn* was to get rid of that bracelet some wizard had locked on your wrist? Well, the Brits apparently have some sort of bracelet fetish, for in *Jinxter* you are seeking a set of charms once attached to the magical Bracelet of Turani so you can put it back together.

A witch named Jannedor has duped people in the land of Aquitania to hide the charms, because the Bracelet prevented her from carrying out her nefarious activities. This also robbed Aquitania of its biggest national asset, its good luck; as usual, it's up to you to save the day.

You'll find plenty of laughs while seeking the charms, for the droll British sense of humor crops up in the most unexpected places. When a dog got hit by a bus, I learned that he was "propelled into the Land Where Doggies Are Eternally Blessed." What was I doing on a bus? It seems some "balmy old lady" had demolished my car with a trolley-load of budget dog food—trying to figure out *how* she managed to accomplish this bizarre feat, which was not explained, was as amusing as the act itself. Lots of humor is in the form of word-play: After I read a book, I was so "baad" that I fell asleep and awoke "feeling sheepish."

As with previous adventures from Magnetic Scrolls, a location's picture turns into a small "cameo" that appears in the upper-right corner of the screen after the first time you've seen it displayed full-size. You can also switch from cameo to full-screen graphics with the function keys, pull the picture up or down a bit to read some text, or turn the graphics off completely.

Versions are available for the Commodore 64 and Amiga. Besides sharper graphics, the Amiga version also lets you make many common decisions with the mouse and pull-down menus. The parser is top-notch, accepting full and complex sentences. On the Amiga, you get RAM Save (saves your game in RAM rather than to disk) and UNDO (which lets you take back a move).

It comes with "The Independent Guardian," a witty newspaper detailing Aquitanian life. This is really used for copy protection, for the program intermittently interrupts the game and asks you to type in a word from a certain part of the "Guardian." I'm getting tired of this kind of copy protection, since it rather jarringly intrudes on the fantasy. How would you like it if you were watching a movie and suddenly an actor said, "Please read the fourth word from the top of your popcorn box"?

Activision's Winning Strategy

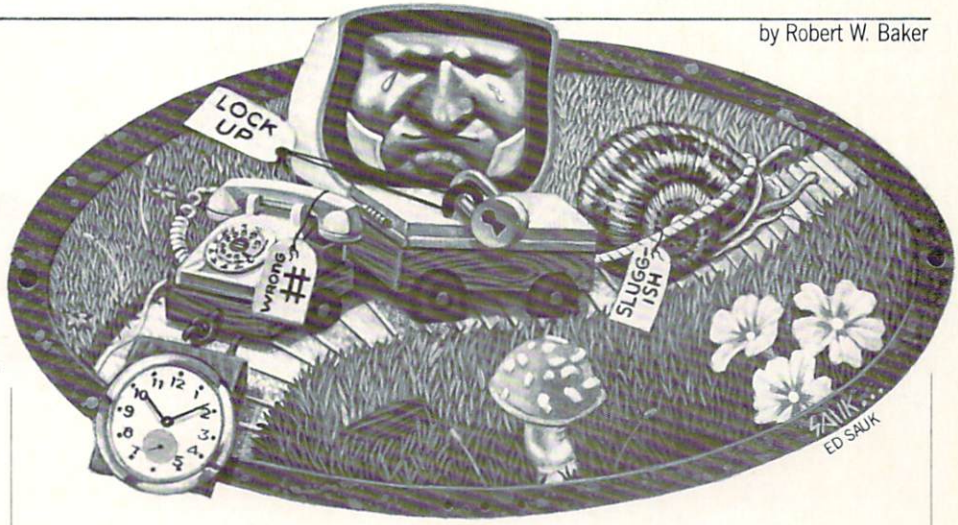
Jinxter and other Magnetic Scrolls titles were once distributed in the U.S. by Firebird, and Activision's shrewdest move this year was acquiring the U.S. distribution of Firebird. (They are now labeled Rainbird, and Firebird is essentially defunct.) Since the graphic adventures from Magnetic Scrolls probably posed the biggest competition for the Infocom adventures (already owned by Activision), Activision has practically cornered the market on high-quality illustrated adventures, (but not on animated graphic adventures, which Sierra has a solid lock on). *[**Editor's Note:** More name games: Activision is now calling itself "Mediagenic." The name "Activision" is one of their* many *product lines.]*

Infocom is concentrating on illustrated "interactive fiction" now, and I won't be surprised if they use the Magnetic Scrolls adventures as an "inspiration." They've already mentioned one similarity: instead of illustrating every location, only key scenes will be pictured; a graphic may remain on the screen for several turns, even though you move to new places.

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by Robert W. Baker

Datacom Woes



Explore the inner workings of the Q-Link telecommunications service with network pro Bob Baker.

In last month's column I mentioned how to access Telenet's online telephone lists via their MAIL service. Well, it appears that they changed the menus and capabilities within that area just after I wrote the last column. You can basically get the same information, but most of the menus within the PHONES section have been changed. Most of the changes are very obvious, just follow the menu prompts presented. The information on accessing Telenet and gaining access to the phone lists is still unchanged.

For those using the Tymnet system, there is a corresponding service available but only through the local input nodes. You have to have a valid Tymnet user ID in order to access their toll-free input nodes. On Tymnet you have to be validated before you can access their information services via the toll-free inputs. On the other hand, Tymnet does have an 800 number for accessing customer service. If you have any problems with Tymnet, you can reach them via (800) 336-0149.

So if you want to find out what Tymnet input nodes are available, grab your favorite terminal program and dial any convenient local Tymnet input node. Once connected, enter the letter "A" in response to the request for terminal type or after seeing a string of garbled characters. You should then see a request to log in to the network. At this point, enter the full word INFORMATION and press RETURN.

You'll see the main menu displayed with a list of the various information functions that you can access. Besides browsing through the input node lists, you can also get listings of various computers and databases that can be accessed via Tymnet, along with complete details on a number of services that are offered. The first three functions in this menu are where you can find whatever you need to know about the available input nodes.

The first function will give you a list of all the states, provinces and territories serviced by Tymnet. This also gives you the expected spelling used to select a specified service area for the second function. To find the available input nodes for a specific area you'll be asked to enter the desired state, province or territory name. Note that abbreviations are *not* recognized, the names are generally spelled in full. If in doubt, check the available location index. If you just want a general list of all available nodes, then the third function will give you the complete listing sorted by location.

While on the subject of networks, here are some comments concerning downloading problems provided by Joe Ekaitis (Joe E3). Joe has been generating T.H.E. Fox Cartoons, found in the Graphics Library and spends a good deal of time online Q-Link.

Joe points out that downloading problems are the bane of every user of any computer network. The host computer suddenly and unexpectedly locks up while the clock keeps ticking away connection time. Or the system you're using simply hangs up on you, leaving a useless chunk of a file on your disk.

What's the typical reaction? Log back on and post a comment bemoaning your problems, trying to get even with the "jerk" who uploaded the file? Maybe others won't download it then, but is that going to do any good? Come on now, you know better than that.

The person who uploaded the file is no more responsible for its failure to download than is a store clerk responsible for a defective piece of merchandise. But human nature needs the balm of personifying its woes, and picking on the innocent seems to be the most effective way to deal with the hurt caused by a problem.

Just remember that *every* file in Q-Link's online software libraries has been downloaded over regular phone lines at least once. The sysop responsible for a given section must download every file and review it before it can be made available to subscribers. If a file just plain refuses to download, the sysop will normally try to notify the person who uploaded the file. So if a file is in the Q-Link library, it *will* download properly under normal conditions.

Now if the files themselves aren't at fault, then where is the culprit? Well, it could be in any of a number of places between your computer and the Q-Link system.

Q-Link is accessed via one of three multiple carrier networks. Since Q-Link doesn't own its own network it leases time from Tymnet, Telenet and DataPac. These same networks also handle calls for other services like CompuServe, The Source, GEnie and MCI Mail among others. Each of these networks is essentially a long distance carrier that handles nothing but computer-to-computer calls.

Like any other long distance service, these networks are subject to the same bouts of poor transmission quality. On a service like CompuServe, this shows up as cursor stalls, skipped characters or garbled text. On Q-Link, the problem appears as an overall sluggishness in response time, due to Q-Link's error recovery system. The sluggishness is due to the fact that the underlying software is continually re-transmitting the same message until it is received correctly.

If you encounter this sluggishness on Q-Link while calling up a menu or waiting for a text item to complete its output, *don't* try to download anything. If you're in a Plus Time area and what you're doing can wait, *get out* and enter a Basic Service area. Plus time is charged by the minute, even when there's nothing on your screen. If the problem doesn't seem to clear up while you're still logged on, simply log off and try your call again.

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INFOCOMICS

A NEW MEDIUM FOR COMPUTER CREATIVITY

by Russ Ceccola

New paths to follow are constantly cleared in the software world. New genres pop up every time a publisher or designer takes two normally disparate elements of computer games and brings them together. The bold release of Infocomics to consumers weaned on the gaming industry's standard fare, marks yet another genre.

Infocomics, a new category of entertainment software, has an appeal wide enough to attract those users whose only reason for touching a keyboard has been word processing or business applications, while at the same time giving diehard computer addicts a new way to enjoy themselves. A collaboration between Tom Snyder Productions and Infocom, Infocomics split the software world wide open to allow everyone (maybe even your mother) to find entertainment in a computer.

Now you may be thinking: "What is this guy raving about?" Until you try Infocomics, you can't possibly understand. While researching this article, I have heard Infocomics described as "computer movies," and "moving comic books" among other things. Infocomics are best described as a new means of presenting a story that is character-intensive, plot-reliant and capable of being viewed from numerous perspectives, similar to soap operas or those "you-choose-what-happens-next" books. Regardless of how you describe them, Infocomics are guaranteed to have you sitting at your computer for hours to watch the story unfold before your eyes.

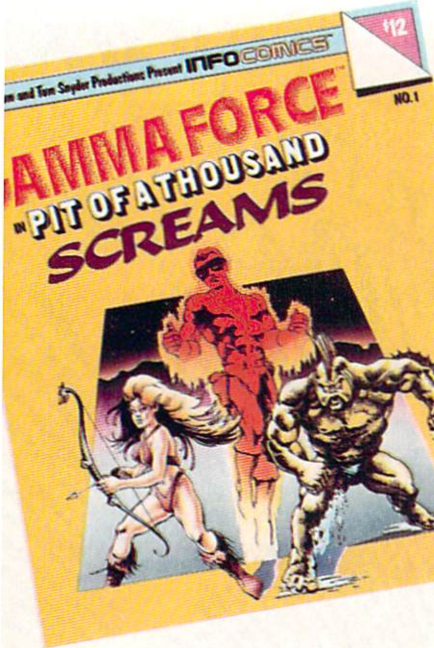
What makes Infocomics even more interesting is the almost complete absence of keyboard input. When was the last time that you went through a story or adventure on your computer and scarcely touched a key? In Infocomics, there are no instructions—only descriptions of the eight keys you can use. Basically, Infocomics require you to just look at the screen and watch the story unfold before your eyes, interrupting at various times (or not at all) to change the direction or viewpoint in the story.

There are eight keys used: The RETURN/ENTER key lets you "jump" to a different viewpoint whenever a turned-down page corner appears on the screen. This perspective "jumping" is the strength of Infocomics. The forward arrow and backward arrow keys are used to fast forward or rewind the story, respectively, to go to different parts of the story at your convenience. The space bar pauses the story or stops the fast forward or rewind process. These first four keys are the only ones you *need* to fully enjoy Infocomics. The next four options are added benefits. The "B" key inserts a bookmark at a desired place in the story. The "R" key restarts the Infocomic. The "A" key advances one frame or page, and the 1, 2 and 3 number keys control the speed of the Infocomic. That's it! Just boot one up, and you're headed for relaxing entertainment with great stories.

The first three releases in the Infocomics line are: *Lane Mastodon vs. The Blubbermen*, *Gamma Force in Pit of a Thousand Screams* and *ZorkQuest: Assault on Egreth Castle*. (*ZorkQuest: The Crystal of Doom* should be available by the time you read this.) Each of the three stories combines many interesting characters and twisting plots to provide a source of entertainment that is well worth the $12 price.

What makes the Infocomics line particularly attractive is the whole point-of-view angle. By switching points of view, you basically have as many different stories (in most cases more) and subplots as there are characters in the story. *ZorkQuest* even paves new roads by allowing you to observe the history of an amulet in the story by switching to its "point of view." Never before have I been as relaxed and mentally alert as when I watched an Infocomic. The feeling is the same as going to a movie theater in that you are transported mentally into another world, but different because you can't pause a movie to get a bite to eat or a drink.


KER-R-RASH
1084
Commodore



"I know that the product will work because I called up my mom and showed her an Infocomic."—*Snyder*

I have an interesting story to tell that illustrates the drawing power of Infocomics. While still in college last spring, I worked in the computer room as a consultant—my only access to IBM computers to evaluate the IBM versions of Infocomics (the only version available at the time). As I sat there staring at the screen, many people came up to me after hearing the music of the comics and thought I was playing a game of some kind. The more people that watched, the more were attracted to the Infocomic. Eventually people started asking what was on the screen, and I found it difficult to explain, because there has never been anything quite like Infocomics before. The point of the story is that the Infocomics attracted people to the computer who never played games before (as well as those who had) and entertained them with a tale worthy of any good bard—the exact goal of Tom Snyder Productions and Infocom.

The collaboration between Tom Snyder Productions (TSP) and Infocom is the source of excellence in Infocomics and one of the primary reasons why they are destined for success. TSP has been responsible for a number of successful and highly effective educational software packages for use in schools. Infocom has long been respected as the company at the forefront of the text adventure game genre. Together, the strong writing skills and character and plot development characteristic of Infocom and the innovative development system, graphics and technology of TSP make up an Infocomic.

Infocomics were developed as follows: a game writer at Infocom developed the script, TSP added graphics and sound to the story based on the script, and then the two companies took what came out of this implementation and cooperated to make the necessary changes and perform the testing of the finished product.

Recently, I had the pleasure to speak with the people primarily responsible for Infocomics: Tom Snyder, Steve Meretzky (*Lane Mastodon* author), Amy Briggs (*Gamma Force* author) and Elizabeth Langosy (*ZorkQuest* author). After speaking with each of these people, I received a very positive overall impression of Infocomics with respect to the future and the success of the present. Let's get to the interesting stories behind the implementation and creation of Infocomics.

Tom Snyder Productions

Tom Snyder is the man behind TSP who has constantly strived to produce software that is unique and trendsetting—something he proved yet again with Infocomics. He recorded with a west coast rock band while attending Swarthmore College, and after graduating in 1972 taught school for a few years and then started his own software company in 1980. If anything, his interests have remained diverse and his experiences have contributed to his captivating personality. Even after talking to him for only 45 minutes, his relaxed style couldn't hide his unique way of looking at things and his instant perception of the state of affairs. About Infocomics Snyder remarked, "I feel like a film director who's making movies that the industry doesn't want to understand."

Regardless of his opinion of his involvement with Infocomics, there is no doubt that TSP was responsible for bringing Infocom's authors' stories to life on the computer monitor. After making an initial draft of the Infocomic, Infocom and TSP worked together to bring their vision to reality. When asked about their collaboration, Snyder told me, "It was fun bringing the two families together, and Infocom showed a lot of courage to stick it out with us and my rantings and ravings about changes to the product." Just pop in an Infocomic, and you can see the result of the companies' efforts.

The first thing that strikes anyone about Infocomics is the fact that nothing like them has ever been attempted before. Infocomics are a trailblazing medium. Snyder related the origin of Infocomics, "We wanted to do something different in entertainment software that had a little more appeal to people who weren't computer hobbyists. We asked if there was something we could create that wouldn't totally anger the industry, but would still take advantage of the computer. We came up with the approach that there is one beginning and one ending, and you can't affect anything that happens in the story. The hook is to let you change the point of view from which you see the story."

There were a lot of changes between the original direction and the final product. Originally, the two companies were going to produce an adult-oriented story, but decided "as an initial concession to the market, we would go with comics," Snyder reported. Also, one of the first ideas was to subtitle the product "Software for the Rest of Us" to try to catch those consumers who might not normally buy entertainment software. Finally, the original name for switching point-of-view was "shoulder-hopping," a name later dropped because it limited the switches to characters and prevented jumps to general stories seen from nobody's view in particular. The changes were made, but the result is the same—highly creative stories that only require watching.

After all the specifics were decided, Infocom and TSP had to decide how to implement the ideas. This was where the writing talents of the Infocom people came into play. Their expertise in that area and TSP's technical people were joined in the final product. Snyder told me,

"Although we have people who would have liked to do some of the writing of the script, we respect the skill of Infocom in this area."

Lane Mastodon was the first result of the co-operative mindjoining of TSP and Infocom. With each new Infocomic produced, the design process became easier and the use of the development system smoother. Snyder said implementing the Infocomics was "like making a film. We have people here with film experience, and the development system is nothing more than a set of director's basic tools. It's a real trip to walk into the programming department and hear, 'I think we ought to cut to her face in this scene,' rather than, 'I think we ought to hide the keys under four tons of manure,' as you would in any adventure game house. We attempted to emphasize the story and characters more in a unique way rather than make another puzzle-based adventure."

Unfortunately, the graphics may seem kind of cheap in Infocomics. A lot of the pictures appear to be nothing more than a few lines and indeed they are. I confronted Snyder with this complaint, and he told me that the Apple computer was the limiting factor in making Infocomics compatible for Apple, Commodore and IBM computers. Also, the fact that there are thousands of images on each disk contributes to the resemblance of some of the scenes to *New Yorker* cartoons. Nevertheless, the graphics are only poor in a few places and are generally pretty good everywhere else. The animation is exceptionally good and many 3D perspectives are shown in motion. Snyder mentioned, "Our people tried to emulate a camera lens in the graphics. A lot of the motion and scene panning is exactly what you would see from a movie camera."

Ultimately, the test of TSP's technological creation will be audience response to Infocomics. Snyder ventured, "Infocomics is threatening to the 'nerd' element in the computer industry, because those people like to remove themselves from reality and life and Infocomics doesn't allow it. The reason I know that the product will work is because I called up my mom and showed her an Infocomic. She sat there all tense with her fingers ready to go at the keyboard, nervous as hell that she would be asked to do something that she didn't understand. But she watched *ZorkQuest* all the way through, didn't touch a button and really got into the story."

If Tom Snyder's mom can enjoy Infocomics, then anyone can, for he told me how critical she was about complex computer games and tough adventures. Don't let her be the judge, however. Boot up an Infocomic and see for yourself. You'll be impressed with the smoothness with which everything flows in the story and the well-placed graphics effects and sound (even though some of the sounds get boring to hear time and again). TSP plans to produce educational software for children from ages three to five years next, modelling them a little bit after the development system for the Infocomics. His final comment on the product: "We have resisted every temptation to add a variety of buttons and options that would make Infocomics a thrill to the hobbyist, but confusing to someone who just wants a good story. We have kept the project pure!"

By switching points of view, you have as many different stories and subplots as there are characters in the story.

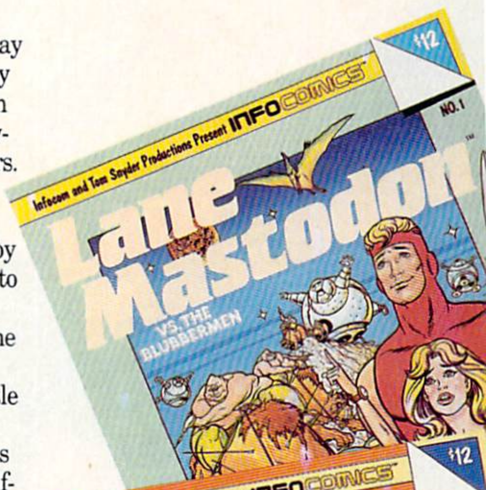
Lane Mastodon vs. The Blubbermen

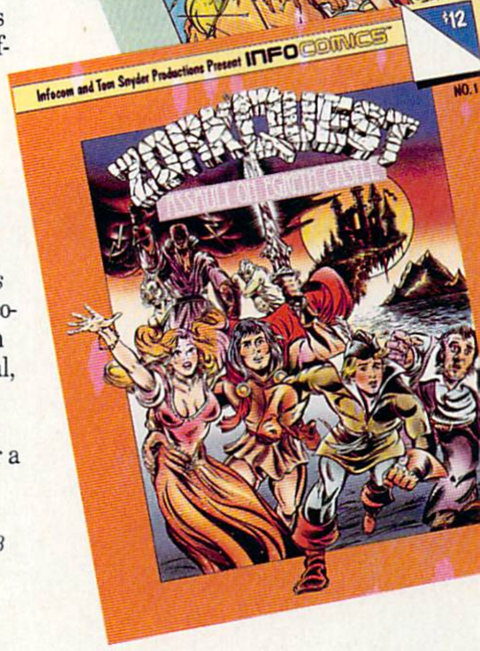
All you sci-fi fans should love the latest adventures of Lane Mastodon, the hero first introduced by Steve Meretzky in his hilarious space romp text adventure called *Leather Goddesses of Phobos*. Meretzky has brought back his bumbling blond in the first installment of Infocomics which is the first in the series of *Lane Mastodon* comics. In this story of Mastodon's travels, he must journey to Jupiter and stop the Jovian Blubbermen from bombarding the earth with an enlargement ray that makes animals and insects bigger.

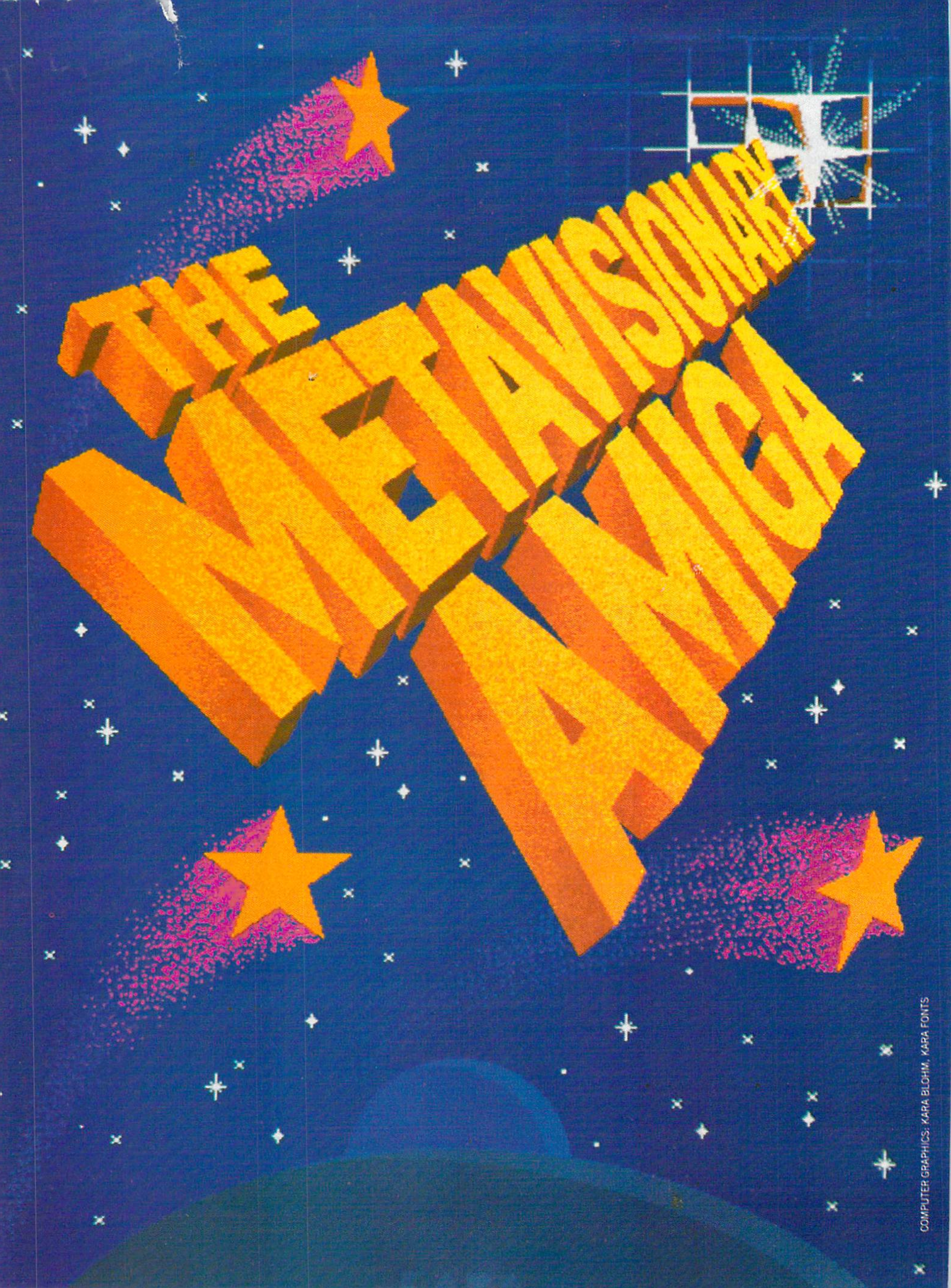
Lane, as the first Infocomic, was a great way to introduce audiences to the series. The story has many twists, turns and surprises as I can attest, because I watched every possible viewpoint in *Lane,* taking approximately six hours. Nevertheless, even after watching *Lane* for that long, I enjoy it just as much today. The plot is really very simple. Lane is instructed by Zabor, director of the Earth Defense League, to travel to Jupiter and stop the enlargement rays that are threatening the earth. Along the way, he rescues Lambert and Ivory—two stranded youths—and finds himself in a battle against the Jovian Blubbermen alongside their enemies the Thin Men. Mastodon meets many characters along the way and many different elements and people contribute to the resolution of the story. I won't give any more away than that.

Definitely the most important character in *Lane* is the title character himself. Meretzky explained to me how Mastodon was changed from his comic book origin to the person we now see in *Lane*. He said, "*Leather Goddesses* was aimed toward adult audiences, and Infocomics is aimed at adolescents. So there was an attempt to move *Lane* away from the satirical, Flash Gordon-type character toward a more obvious, adolescent level of humor. He ended up with elements of both. Now, he's no longer a bland, courageous hero, but a dumb, lucky hero. He became more interesting and less one-dimensional."

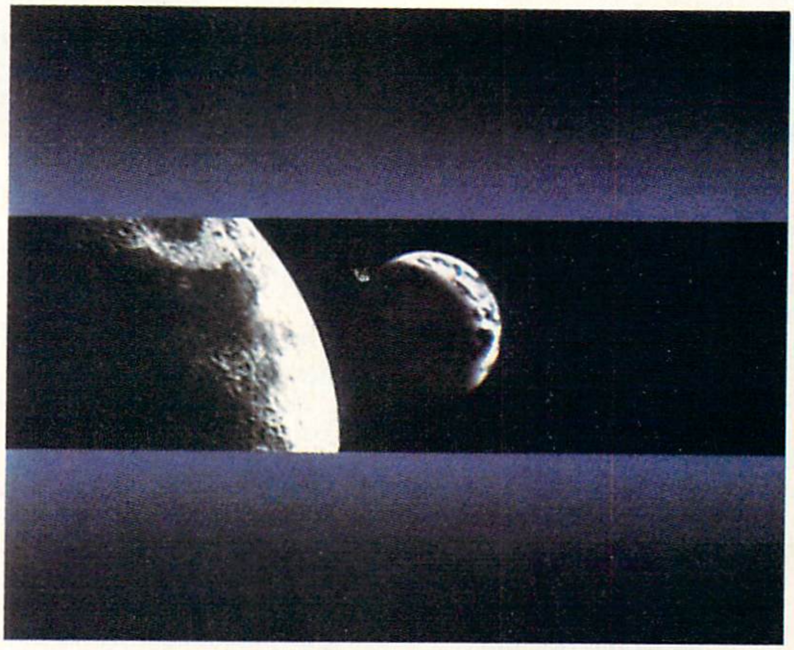
Continued on page 93







COMPUTER GRAPHICS: KARA BLOHM, KARA FONTS



The opening image in the National Geographic centennial show presents the Earth being revealed by the Moon. The seamless image is made of three elements manipulated in post-production: the background of gently moving Amiga stars, the Amiga "DigiViewed" photo of the Earth, and an overlay of the Moon.

by Ben and Jean Means

"It's not what you know, but who you know" as they say in Hollywood, and Metavision's client list is full of companies worth knowing, like Universal Studios, The National Geographic Society, McGraw Hill, Rockwell International, Yamaha and Pioneer Electronics. Metavision are the inventors of 3 V, the powerful three-screen panoramic video process, which raises video to "its first level of *true* spectacle" and are confirmed innovators in the field of new technologies. So it is no surprise that along with Chyron titles and Quantel Paintbox graphics, Metavision's Peter Inova uses their vintage Amiga 1000 constantly.

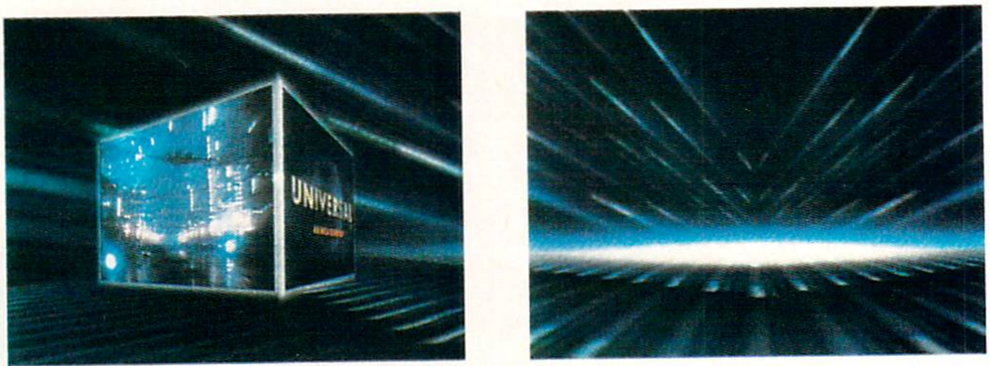
Metavision's Amiga paid for itself on the very first job. The multi-screen show for the Universal Studios Tour called for a dramatic opening effect of comets shooting out from the horizon. Rendering just this one special effect on a high-end graphic computer would have cost over $10,000, so Peter Inova examined his alternatives and bought an Amiga instead. Inova literally took the Amiga right out of the box and designed a color cycling brush with *DeluxePaint* and manipulated it in an ADO (Ampex Digital Optics) to add perspective. He had the stunning effect he wanted, an Amiga on his desk and had saved thousands of dollars in the process! Says Inova, "That effect is basically just one *DPaint* brush, and now it's down at the Universal Studios Tour blown up to 30 feet wide and showing 120 times a day!"

Metavision co-founder Theo Mayer adds, "As a production company, we've been completely unembarrassed about applying anything that works. The Amiga is a computer that makes video; put a computer that makes video in Peter's hands, and he'll make it do things that are completely satisfying in a commercial context, good enough for the world's largest movie studio to buy and love.

"The focal point of the company is that we are appliers of technology; we didn't set out to do that—it's just the way we are. And we don't just use inexpensive stuff to do expensive-looking things; sometimes we use very expensive stuff too.

"For example, Rockwell was working with NASA on the Space Shuttle in 1982, and NASA was supplying the media (a very sophisticated audience) with sophomoric visions of what the Space Shuttle was all about. But since the Shuttle was a world event with a highly sophisticated audience, we suggested using the best tools of Hollywood to simulate reality. We created a full bore motion control camera simulation of the Shuttle at the facility which produced *Buck Rogers* with the model maker for *Star Trek*. The storyboard simulation was so real that the astronauts realized for the first time that the shuttle would go into orbit sideways, and that looked unnatural. They asked NASA to fly the shuttle nose towards the direction of orbit; so they actually changed the mission based on our storyboard!"

Mayer explained, "Here was an effective example of using very expensive Hollywood technology for a mundane video news release. The point is the application of technology. In this case, the most appropriate technology just happened to be the most expensive one, but in many cases, like the Universal Studios Tour, the Amiga works just as well as a high-end graphic workstation would."



Miami Vice's Don Johnson shoots from a spinning image cube as an animated Amiga graphic background creates a huge three-screen panoramic in the Universal Tour show.

The Early Days

The quest for leading edge technology was one reason for founding Metavision. In the mid '70s, Mayer was promoting the revolution of home recording studio for TEAC, which at the time meant a Model 2 mixer and a 3340 four track recorder. The grind of jet lag and endless repetitions of the same slogans week after week drove Mayer to look for an alternative, so he and long-time friend Peter Inova packaged the home studio pitch into video and multi-projector slide shows. Now TEAC could send out a video or slides instead of Mayer's travel-weary body.

Commodore released the Amiga that fall, and Inova quickly put it to use on the Universal Studios show, which won a Cindy award.

Mayer and Inova realized the power in this advancing presentation technology and formed Metavision in 1976 along with Rebecca Mayer and Peter Chernack. As word of their abilities spread, their staff soon swelled to 33, and their multi-screen slide shows expanded gloriously into a 30-projector extravaganza slide show for Mattel that also included two video feeds running in sync with the slides.

Says Inova, "The staff of 33 built the 90-minute, 30-projector slide show over a period of three months. But I got our first video edit bay equipment, hooked it together, and built the 180 minutes of in sync video in 20 days with a staff of two! Video is intrinsically faster than a hands-on intensive medium such as slides."

Metavision won the gold Ami, given by the Association of Multi-Image, but the economics of multi-projection slide shows convinced them that it was time for a change. "Here we had won the biggest Oscar of the multi-image industry, but nobody was driving a Rolls Royce," says Inova. "So we paid everybody bonuses, shortened the company down to the basic four and began producing multi-screen video."

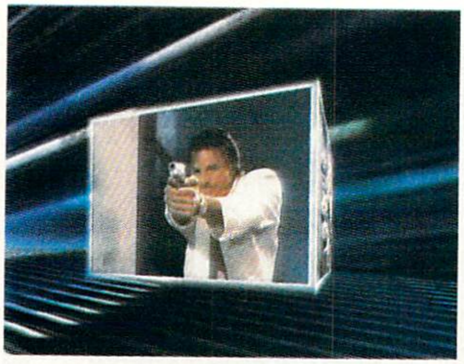
The 3V Process, Universal Studios and the Amiga

Metavision pioneered a method of projecting video images onto large screens in sync, which they called 3V. This is a format invented by Inova which can show different images at once or can link three screens together to form a vast panorama with only two small seams between the screens. According to Inova, "An extraordinary thing happens when three or more video projectors are carefully aligned next to each other and then are fed three separate, but synchronously prepared, video tape or disc sources: The trio of screens suddenly becomes the carrier for communicated information that is far more appealing, exciting, motivating and enjoyable than information formatted in slides, film or single screen video presentations." 3V has dramatically told the corporate story for giants like Rockwell, Roland, Universal Studios and the ABC affiliates.

Inova used the 2D *Aegis Animator* on "Auto Repair for Dummies," a McGraw Hill instructional tape starring Rich Hall.

Their first brush with in-house computer graphics was some wireframe Apple II graphics Inova produced for the 1985 Winter NAMM (National Association of Music Merchants) show. Commodore released the Amiga that fall, and Inova quickly put it to use on the Universal Studios show, which won a Cindy award. Says Inova, "Universal became convinced that they needed to redo that show because of an executive who was showing the tour to the Premier of China, Deng Xiaoping; that executive was both surprised and embarrassed when he saw the poor quality of the old show. They had two 16mm motion picture projectors and 24 slide projectors; about one of every eight shows would miscue because of a slide not dropping or a projector jamming. Their regular department for attractions was busy building the 30-foot King Kong, complete with banana breath, so they didn't have any manpower to redo this show. We had been bugging them for a long time about multi-screen video, so they called us. We got the job because of King Kong and the Premier of China! [He laughs.] And we delivered it on time and under budget. Their old show had cost $120,000 a year for a union projectionist and replacement prints; we built them a new show that runs automatically from videodisc with 100% reliability."

The Universal Studios show is an impressive demonstration of Hollywood special effects, but the Amiga generated the special effects that open, close and tie the three segments of this Hollywood ultra-tech show together. True to the best special effects Hollywood has to offer, the first segment uses the climactic ferris wheel scene from Spielberg's *1941* against a backdrop of part of the original model amusement park to show matte photography combined with models. The second segment recreates the flying bicycle sequence from *ET* to demonstrate chroma-keying by using a child from the crowd, and the third segment, a clip from *Miami Vice,* demonstrates music scoring and Foley. With the magic of 3V, Jan Hammer adds the mood music on the left screen, Crockett and Tubbs spring into action on the center screen and the Foley man adds the sounds of footsteps, doors slamming and shattering glass on the right screen. According to Inova, "With one pair of eyes, you can go from screen to screen to screen and see how things are relating in different moments of time. This is the perfect use of 3V, because it shows three par-



allel processes at the same time—two supporting and one result."

Starring the Amiga

Between each segment, shooting stars generated on the Amiga sparkle and fill all three screens with animated luminescence as a dazzling segue between cuts. "It started out as a little black up to blue, back to black color cycle bar," adds Inova. "We created the illusion of speed by scaling this brush up and down to create bars of different sizes. Since they're different sizes, they appear to be streamers moving at different speeds. We took the flat image into the studio, shrunk it down with an ADO so the bars appear to be at different depths, and then blended in a little horizon glow with the switcher as if the sun was just coming up. We built a three-dimensional image very quickly, and when you see it it's hard to imagine that the stunning 30-foot wide final result sprang into life as a single *DPaint* brush. The audience really has no idea that it is seeing an Amiga graphic!"

The Vintage Amiga System and Software

Metavision's off-line Amiga setup is simple but effective, with an Amiga 1000 and a 1300 genlock, which is output through a 3M proc amp to videotape; Inova gets true NTSC color bars from the Amiga by watching the vectorscope and adjusting the proc amp. They also have the DigiView digitizer and, not surprisingly, *DeluxePaint II* is their most-used piece of software. Inova thinks the latest crop of 3-D animation programs aren't "quick and useable enough yet." He adds, "Most of what we've done so far is just color cycling in *DPaint II*. Color cycling is an incredibly useful idea."

However, Inova used the 2D *Aegis Animator* on "Auto Repair for Dummies," a McGraw Hill instructional tape starring Rich Hall. An animated cartoon auto rolls its way merrily across the screen for the opening credits and jumper cables jauntily spring to their terminals to demonstrate the proper hookup. The Amiga even shared in the titling along with the Chyron. Since then Inova has used *Kara Fonts* and ADO effects to increase the Amiga's titling abilities. The ADO can shrink titles to sharpen the Amiga's apparent resolution and also add perspective dimension for pseudo 3D effects. Mayer finds the Amiga's titling abilities are "perfectly acceptable in certain cases, even beyond acceptable in others. In fact, I prefer some of the things we've done on the Amiga to what we were getting on the Chyron."

So what are they giving up? "Paying for the Chyron is what we're giving up," was Inova's prompt reply. "The Amiga buys us everything and doesn't cost anything extra. I've got nothing against higher-end computer graphic systems . . . except the cost."



The 'Secure Channel Decoder' on top of the video cassette recorder is just a gleam in the artists's eye. Faced with the need to show a non-existing piece of hardware, designer Inova simply drew one over a live video image, matching the lighting characteristics of the rest of the scene.

Even when the final rendering is on the Quantel Paintbox, Inova saves money by designing his preproduction work on the Amiga. "I'll create the title I need on the Amiga as a simple series of one-color stencils and transfer it to ¾ inch. Then I go into the online bay with the Paintbox artist and say 'Frame capture that stencil; now fill it with chrome.' And all of a sudden, I've got a lovely set of letters that look as good as anything the Paintbox can create. At $350 an hour, drawing that picture on the Paintbox could easily have cost $450. Sitting at my Amiga, it can cost me a dollar and a half on that month's electric bill, plus just a few minutes of Paintbox time, instead of hours."

Adds Mayer, "The stencils aren't going to get a whole lot better on the Paintbox when it's going to NTSC anyway. We use the Paintbox for the smooth color gradations that it does so well, but not to create art pieces. Good heavens, that's too expensive!"

The Paintbox artist was astounded when Inova showed up with the finished stencils; according to Inova, "She couldn't quite fathom that we had done these on an Amiga." Mayer adds, "One of the things that makes me proud of Metavision is that what we're doing is not that amazing—that we're doing it is amazing! We trust these technologies; my background was establishing the home recording revolution. The one thing that we discovered early on is that if you're producing a low-end line like Tascam, it had better be a whole lot more reliable than the $50,000 pro studio version. There is no maintenance staff at your house, while the place with the one-inch machines have round-the-clock staff to keep them working. For a manufacturer, it's a real consideration."

Metavision designed this reliability into the Universal Studios presentation by using videodiscs instead of film or videotape. Mayer adds, "One of the amazing things about this technology is it plays big, beautiful and awesome and is completely automated. You don't ever have to touch it, and it never breaks. We've had the installation over at Universal running 75 to 120 shows a day for over two years, and it always looks as good as it did yesterday. The show doesn't even need an operator because it's just a computer-driven rack with three video disc players, a controller and some audio amps. When we were doing multi-projector slide shows, we had stacks of projectors with computers attached to them and wires going everywhere. Each projector you'd add was just one more disaster waiting to happen. Now when we set up a show, all we ever have to do is drop by once in a while to see if one of the video projectors needs a fine tweeking on its focus or alignment. We couldn't make cost-effective shows like this without laser optic media."

The Manual for Multi-screen Video Production

Sam Stalos, Editor of *AV Video*, invited Inova and Mayer to lecture as the experts on multi-screen video at the All Pro Seminars where they couldn't resist the temptation to play "spot the Amiga graphic" with their professional audience. Mayer explains, "Peter would run a tape of the Universal show, and at the end we'd ask if people thought the graphics were expensive. Everyone thought they were Paint-

Continued on page 90



GARY V. FIELDS/AL COLLETT

JOY OF INPUT

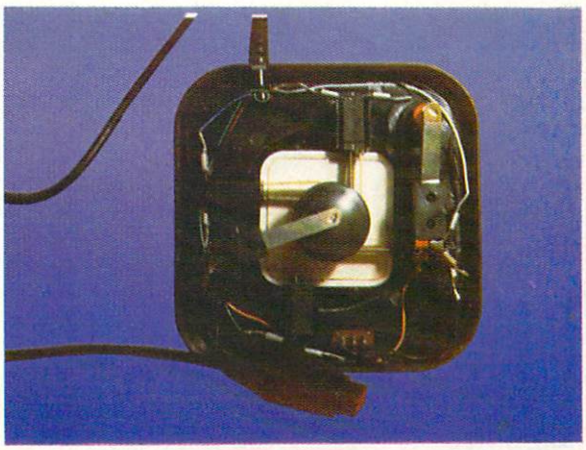
If you find you have a dead input device, don't replace it until you've tried to resurrect it. Here's a step-by-step trouble-shooting guide for your joystick and mouse, along with some tips to keep your input device in top playing condition.

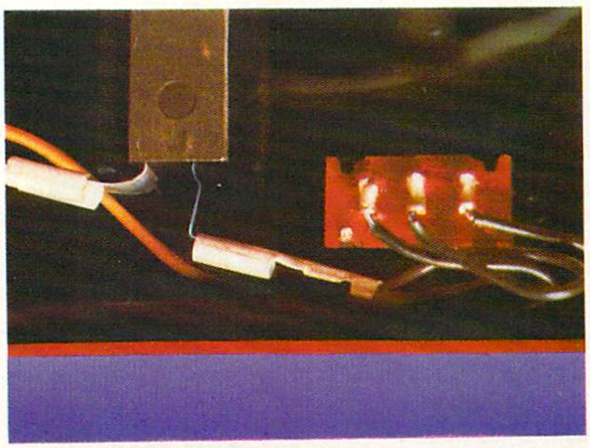
by Gary V. Fields

Like many of the articles we publish, this one begins with a personal problem and ends with its solution. The problem first surfaced during a late evening boxing match with my six-year-old son. We were going head to head with Activision's *Star Rank Boxing II*, with the middleweight championship of the world at stake. I led with a punch to the body to soften him up, then followed with a heavy cross to make sure he knew I was serious. After some graceful moves and bobs to keep him off balance I tried to unleash a flurry of jabs to get him ready for the knockout. But nothing happened. My boxer froze—but my son's did not. He unleashed a torrent of jabs which had my boxer reeling. I tried to get my man to lean back to avoid those flying fists, but he seemed glued to the mat. Before I could escape, the match was over, my boxer was face down on the canvas, and my son was doing a victory dance.

My son was delighted, but I must admit my confidence was shaken a bit. After all, what 39-year-old man enjoys having a six-year-old (even his own son) going around claiming he can beat him up—even if only in a game? So after I tucked my son into bed, I returned to the game and uncovered a big problem—my boxer suffered an insurmountable disability. The number two position on my joystick (up and to the left) was dead. Therefore, when I pressed the stick in that direction no signal was sent to the program. When I had tried to get my boxer to jab or lean away from a punch, the program had received no input at all, and he just stood in place and took a licking.

To confirm my observations, I wrote a short BASIC utility program (listed on page 60) which tests the signals received through either of the





Wire connections to check: Upper photograph shows the opened underside of the joystick. Lower photograph is a close-up of the wire connection area. The two wires to the left are connected to one of the switches. The three soldered wires on the right connect to the cord.

Most joysticks will show a ball (at the base of the handle) surrounded by four to six pairs of metal switches.

64's or 128's game ports. Without such a dedicated testing program, checking an input device's signals can be suspect and annoyingly slow. But the test program reports each port's and device's health immediately and flawlessly.

The program first asks which port you intend to test and then graphically responds to signals sent through that port. Thus, when the fire button is pressed the center circle flashes, and when the stick is pressed in any of the eight possible directions a diamond flashes in that position: 1—up, 2—up and right, 3—right, 4—down and right, 5—down, 6—down and left, 7—left, and 8—up and left. When the fire button and stick are pressed together, both the direction signaled and the condition of the fire button are reported with flashes on the screen.

This makes it easy to test and detect malfunctions of any device which responds like a joystick including the 1350 and 1351 "mice." To reselect the port you want to test, just press the space bar. Because the older 1350 mouse is just a glorified joystick, it can be checked just like a joystick, but the 1351 which is a true proportional input device cannot. Still, the 1351's performance can be checked with the program. To test the 1351 with the accompanying program, simply turn it into a 1350 clone by depressing the right button while powering up your computer. With this done, the device will respond like a joystick and can be tested with the program.

If a device is working properly, a diamond will flash continuously each time you change the direction in which you press the stick. If you can't get all eight diamonds to flash and the fire button to report, you know you probably have a problem with the device or the port itself (see Isolating Other Problems).

How To Fix The Problem

If you find you have a dead input device, don't replace it until you've tried to resurrect it. Sometimes fixing a device is as simple as cleaning a contact or replacing a broken wire.

Opening most devices requires only that you remove the screws holding the base. (Needless to say, opening a device still under warranty is not a smart move, since it will void the warranty—return warranted devices to the manufacturer instead.) Usually, the only tool you'll need is a phillips screwdriver. If the base is made of a sealed plastic showing no screw heads, you may be in trouble. One of my favorite joysticks is constructed this way. If yours shows a seam, try prying it

A LITTLE BONUS

Although not intended for that purpose, the accompanying program can easily be incorporated into your own programs (as a subroutine) to detect joystick input. The program is just an expanded version of the example listed on page 344 of the *Commodore 64 Programmer's Reference Guide*. Lines 400-414 determine what response the program takes when the joystick is pressed in a direction and line 90 does the same if the fire button is pressed.

Don't use this program as a subroutine on a 128 in 128 mode, since the memory locations would have to be relocated for it to work. And since BASIC 7.0 has special commands for handling joystick input it makes more since to use them. I used BASIC 2.0 (the 64's on board language) for the test program because it lets me check both my two 64s and two 128s without having to write two different programs. For more information on BASIC 7.0 joystick input see page 309 of the *Commodore 128 System Guide* which came with your 128 computer.

```
5 PRINT CHR$(147);CHR$(142);CHR$(5)
   :POKE 53281,0:POKE 53280,1'GGFN
6 PL=54272'BHGG
7 NW=1313:N=1314:NE=1315
   :TB$="[SPACE8]":REM 8 SPACES'FGIQ
8 W=1353:F=1354:E=1355'DRKL
9 SW=1393:S=1394:SE=1395'DTUN
19 PRINT"CHECK JOYSTICK PORT 1 OR
    2?"'BAON
20 GET A$:A=VAL(A$):IF A<1 THEN
    20'GNKE
21 IF A>2 THEN 20'DEIB
22 GOSUB 600'BDJB
23 PT=56322-VAL(A$)'DLAF
60 POKE F,87:GOSUB 100'CIHE
65 IF JV=0 THEN 80'DFCK
70 GOSUB 400'BDHE
80 IF FR=16 THEN 60'DGWH
90 POKE F,91:POKE F+PL,7:POKE F,81
    :POKE F+PL,2:GOTO 60'HYTO
100 JV=PEEK(PT)'CGJX
110 FR=JV AND 16'CGAY
120 JV=15-(JV AND 15)'DKEB
150 GET A$:IF A$=CHR$(32)THEN RUN'GJSF
199 RETURN'BAQN
400 IF JV=1 THEN POKE N,90
     :POKE N+PL,7'GNVE
402 IF JV=2 THEN POKE S,90
     :POKE S+PL,7'GNCH
404 IF JV=4 THEN POKE W,90
     :POKE W+PL,7'GNMJ
406 IF JV=5 THEN POKE NW,90
     :POKE NW+PL,7'GPSL
408 IF JV=6 THEN POKE SW,90
     :POKE SW+PL,7'GPEN
410 IF JV=8 THEN POKE E,90
     :POKE E+PL,7'GNKF
412 IF JV=9 THEN POKE NE,90
     :POKE NE+PL,7'GPLI
414 IF JV=10 THEN POKE SE,90
     :POKE SE+PL,7'GQLK
600 PRINT CHR$(147):FOR X=0 TO 3:PRINT
     :NEXT'HLRG
610 PRINT"[SPACE4]JOYSTICK #";A'BCFF
620 PRINT TB$"[SHFT U,SHFT *3,SHFT I]
     "'BDDH
630 PRINT TB$"[SHFT B,SPACE3,SHFT B]
     "'BDGG
640 PRINT TB$"[SHFT B] [SHFT W]
     [SHFT B]"'BDPH
660 PRINT TB$"[SHFT B,SPACE3,SHFT B]
     "'BDGJ
680 PRINT TB$"[SHFT J,SHFT *3,SHFT K]
     "'BDTN
699 RETURN'BAQS
```

END

apart by pressing a screwdriver blade between the joints and twisting. If the base refuses to open you have only two choices: (1) trashing the device or (2) forcing it open by carefully sawing through the skin on all four sides. The second choice is drastic and if done carelessly could damage internal parts. But the way I figure it, if the thing is already dead anything is worth a try. At worst, you'll gain some experience and maybe some spare parts. If you can open the molded plastic device (without destroying the working parts), you'll have to glue or tape it back together after you've repaired it.

Now assuming you have the device open, inspect all the connections. Most joysticks will show a ball (at the base of the handle) surrounded by four to six pairs of metal switches (four for directional input and one or two controlled by the fire button). These usually look similar to tweezers. When the handle of the joystick is moved, the ball presses against one side of the four switches and forces it to close. This contact closes the circuitry "gate" and sends a small voltage signal to the computer through the corresponding port pin. Thus, when you press the handle to the right, it causes the corresponding switch to close and send the required signal to the program monitoring the game port. When you press the joystick diagonally, two switches are closed sending two signals to the computer at the same time. The fifth and sixth switch are used by the fire button (some joysticks have two fire buttons—one on the base and one activated by pressing the end of the handle). These switches respond to pressure just like the four directional switches.

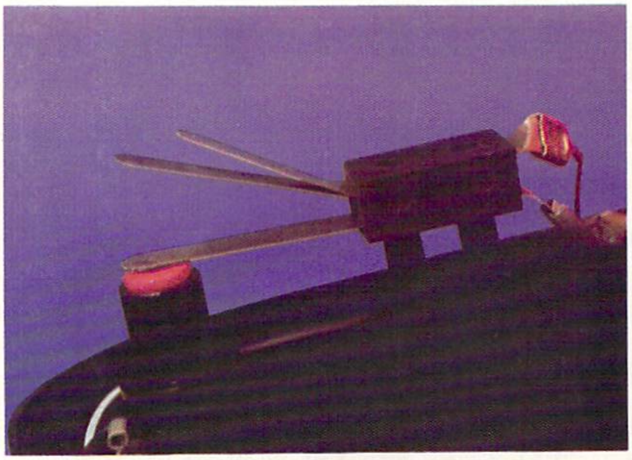
If any of these contacts become dirty (sometimes grease or fragments of plastic clog them) no signal is sent when the handle is pressed and thus no signal is transmitted. The first thing to do when you have the device open is to check and clean all these switches. You can use spray contact cleaner like those sold at Radio Shack for TV tuners or just rub the contact areas with some fine grade (240) sand paper. An emery board works well too.

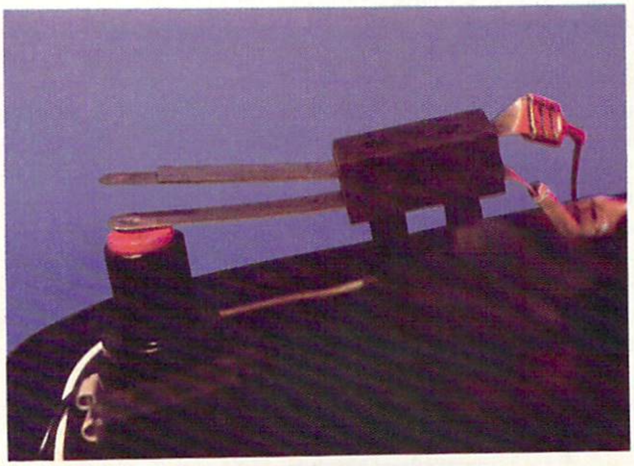
Next move the handle and watch to see if the movement closes all the gates. You should do this with the joystick connected to the computer and the test program running to fully examine each switch's health. If any of the spaces between contacts are too wide to touch when the stick is moved toward them, bend them back so they touch when the handle is moved. The same is true of the switch which is triggered by the fire button. Nine times out of ten, these minor adjustments are all you'll need to do to repair your joystick.

Next visually check all the wire connections and give each a gentle tug. If any are broken or loose, you'll have to replace or solder them—not a difficult job. If you don't feel comfortable with solder and soldering irons, take it to a friend or a TV repair shop to get the deed done in no time flat. With the program running and the joystick connected to the computer, press and hold the handle in each of the eight positions while wiggling the wire. Do the same thing while pressing the fire button. If the screen dis-

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To test the 1351, simply turn it into a 1350 clone by pressing the right button while powering up your computer.





Correcting leaf switch problems: Upper photograph shows the metal switch below the fire button with the contacts bent out of position. When the fire button is pressed, no connection will be made. The lower photograph shows the contacts of the metal switch bent back to their correct positions.

by Graham Kinsey

Amiga Public Domain

Although Fred Fish didn't release any new disks this month, there were many new programs showing up on PeopleLink and the local BBS's that helped take up the slack. The important programs this month include an Amiga version of the world-famous Norton Utilities, two impressive demos of the new power added to *VideoScape 3-D* version 2.0, plus updates to programs reviewed earlier this year.

For each program, the author is given when it is known. If I get a PD program directly from PeopleLink's Amiga Zone, I list the Amiga Zone download file number (if no file number is given it still may be on PeopleLink, but I obtained it somewhere else). When a public domain program has been classified as shareware, this is also mentioned with the suggested amount.

Lucifer: by Jack Radigan
(AmigaZone file #11403)

This program will encrypt Amiga files for those who need added security. It uses an industrial-strength encryption algorithm developed by IBM called Lucifer.

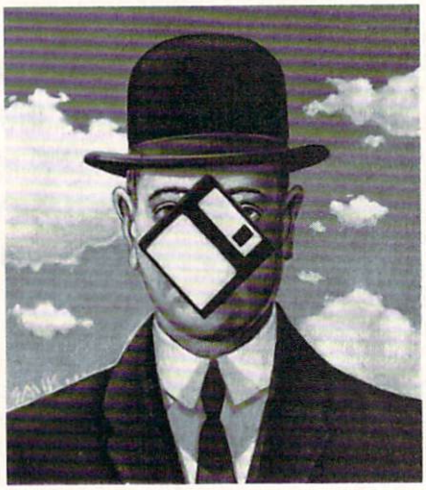
Sunday Driver: by Greg Cunningham
(AmigaZone file #11192)

Here's something simple that will allow you to take your Amiga for a quick little spin. With a joystick plugged into port two you can maneuver a "radio-controlled" car, complete with batteries that eventually wear out (just like in real life).

Glass and Teapot: by Allen Hastings
(AmigaZone file #11286 and 11280)

These two *VideoScape 3-D* demos show off some of the major improvements to *VideoScape 3-D* in the new version 2.0. The Glass demo shows a champagne glass rotating in front a digitized HAM picture. Not only does *VideoScape 3-D* support HAM now, but it also has a transparency mode (i.e., you can see through the rotating glass).

The Teapot demo shows off mirror color mode. When this mode is set, the color for each polygon face is determined by what direction the face points towards. If a face is pointed towards the ground, the color of that face will be the ground color.



ED SAUK

Both of these demos show off the remarkable Phong Shading mode. Basically what this mode does is to give a ray-traced look to any *VideoScape 3-D* object. No longer do you have to use a ray-tracing package in order to produce stunning results.

Fade: by Harold Walpert
(AmigaZone file #11294)

If you're a C programmer, here are some routines to manipulate the color palette. Included are routines for fading to black and fading back from black to the original color palette You can also choose to fade to/from color register number zero instead of black.

TellStar: by Jim Robinson
(AmigaZone file #11220)

An interesting three-part *VideoScape 3-D* demo of a spaceship flying by a planet. This demo requires one megabyte in order to run.

ViewBoot: by Brian Meadows
(AmigaZone file #10176)

ViewBoot is an easy-to-use alternative for those who would like to be able to check the boot block of an Amiga disk for the presence of a virus, but don't need the power and complexity of a full disk editor. When ViewBoot loads, it will immediately check the boot blocks of DF0: for the presence of a virus. It will then display the boot blocks of DF0: and whether or not a virus was actually found (which will allow you to check for a new virus that ViewBoot doesn't know about). You can then check for a virus in any other floppy drive you have hooked up to your Amiga using a colorful and simple menu. ViewBoot does not write to any disk, so you will still have to use the AmigaDOS INSTALL command to kill any virus that has been detected by ViewBoot.

Sonix-Progressive: by Tony Solomon
(AmigaZone file #11166 and 11167)

This remarkable disk is the first musical pseudo-compact disk for the Amiga. On this one disk are an amazing 82 minutes of Amiga music! All the songs have digitized sounds, and the overall quality of the music is pretty good (although not as good as the famous *Sonix/AudioMaster* songs). Not only does this disk auto-boot and play automatically by itself, it also displays some pictures while the music plays. The best picture by far is a hi-res color rendition of a compact disk, including a listing of all the songs printed on the surface of the compact disk.

Archa: by A.G. Kartsatos
(AmigaZone file #11767; Shareware: $15)

A mini Dir-Util type program that specializes in creating and manipulating archives. Archa will work with PAK, ZOO and ARC archives. (Although Archa is incompatible with PKARC archives.) Gadgets are included for moving across directories and archiving files in different directories.

Booz: by Rahul Dehsi

This is a small and quick de-arcing program for use with ZOO archives.

Nag version 1.7: by Richard Stockton
(AmigaZone file #11703; Shareware: $10)

This is an update to the calendar program with a "remind" feature called Nag, originally reviewed in the April 1988 installment of this column. New features that have been added include support for military (i.e., 24 hour) time, stereo sound support and improving the recall buffer to hold up to nine items. Many other bug fixes and small improvements have been made.

Drip: by Dr. Gandalf
(AmigaZone file #11791)

Here is another great animation by the author of GhostPool. The frames for this animation were created with DBW Render and assembled into an animation with Byte by Byte's *Movie* program. This animation includes digitized sounds and requires one megabyte in order to run.

Marble Factory: by Dr. Gandalf
(AmigaZone file #11794)

Another nice ray-traced animation produced with DBWRender and *Movie*. Sur-

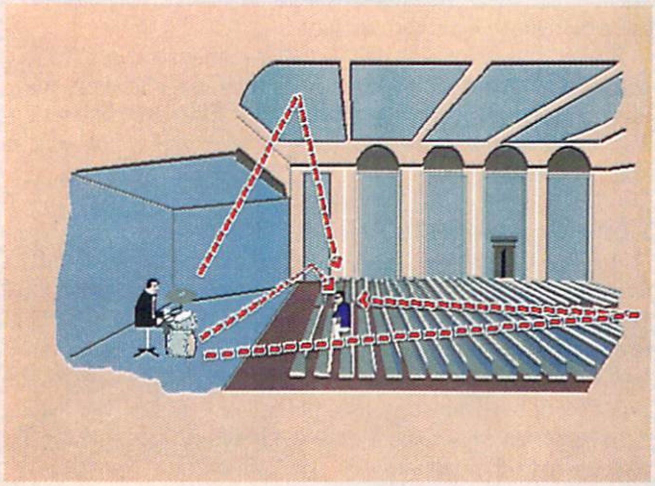
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The Amiga in Video

by Matthew Leeds



Animated Video Painting
—Marjorie Franklin.



First Light Video Publishing—*Artwork by Christopher Reed.*

The Amiga is the first consumer computer with the power and functionality to be used in professional video applications. It has been used to create title effects in industrial video training tapes, animations in network news programs, graphics for boardroom presentations, and lifelike recreations of accidents for liability cases. I interviewed several video professionals to find out how they use the Amiga every day in their work. What follows is in their own words, based on recorded interviews.

Marjorie Franklin
Animated Video Painting

My first job in computers was in 1961, I got a job in the Apollo project with NASA. I learned how to program on the job and worked as a programmer for five years. I got bored and quit. I enrolled at the San Francisco Art Institute and got a degree in film editing.

I heard about the Amiga in 1985, and got excited about it. In December of '85 I bought my first Amiga and started fooling around with it. I did not have a lot of time to work with it at first, as I had a very demanding job at the time, but after about a year and a half that job slowed down.

Also at that time I had trouble going to video from the Amiga. The only available genlock was inadequate, and the software tools just weren't sufficient. Finally with the announcement of the SuperGen [Digital Creations] and a few new software programs, things began to change.

In February of '88 I decided to start my own computer graphics company. I paid for a booth at a local video expo and showed off the work I had done so far. The expo resulted in a few new clients.

I did a job a for a subsidiary of Texas Air—a video logo. I did another job for a cable show, also a logo. I also did a video for a computer company that was used to demonstrate their services. That video was used in trade shows in their exhibit, running in a loop. I have other jobs coming in, most as a result of that expo.

I am also going to be giving a class at the Bay Area Video Coalition. I've been taking classes on video production there, and my instructor had seen my work and recommended that I teach a class on computer graphics.

I've been having trouble with overscan on the Amiga. Every product seems to have a different standard. For example, when I go between *DeluxePaint* and *Video Titler* the screen size shifts. I've also had problems with overscan and my hard disk.

I've also used *VideoEffects 3D*. It was perfect for a job I did. Although it has a fairly long rendering time, I like the results. I can create images with other programs, save them as objects, and move them into *VideoEffects* and put a motion on each one.

For the job I did for the West Coast Computer Faire I used *The Director* and *DeluxePaint*. I'm very fond of *The Director*. I don't mind working in a script-driven environment. I used to be a programmer. It took me only about an hour and a half to put my first presentation together with it, and that included using about 65 different images. It just seemed very clear how to use it.

I have all three Amigas. I mostly use the 500 if I have to show someone what I do and how I work. I use the 2000 for most of my work, and sometimes I use the 1000 in tandem with it. If I am using *Video-Effects* I can only get a certain number of objects on the screen at once. I use the SuperGen and overlay images coming from the 1000 onto the 2000. This lets me build up a more complex set of effects.

The 2000 has a 40MB hard disk and a Hurricane 68020 board. I also have a total of 9MB of memory in the 2000. Just a standard setup. I would like to get the 4MB 32 bit memory board as well to speed things up.

I have had people look at what I've done, then later find out I used an Amiga, and ask me why I didn't use a different system, a more expensive system. There has been some resistance once they find out I use an Amiga. Sort of why didn't you join the club?

I tell them the truth: that I have used other systems, and I have found that they are much more limited than the Amiga in some respects. There is a much greater variety of software available for the Amiga. The other systems are much more expensive, and they give you a certain sort of look. I feel like people are getting to the point where they want a different sort of look—like you see in the music videos.

If I could wish for something else for the Amiga it would be for more colors on the

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by John Iovine

Mandelbrot Graphics

for the Commodore 64

Mandelbrot graphics are named after IBM research fellow Benoit Mandelbrot who developed the field of fractal geometry. Mandelbrot coined the term "fractal" to describe this special type of geometry. Basically a fractal is a geometric object with fractional dimensions.

Computer graphics have enhanced our understanding of mathematics, while adding a dimension of beauty. Patterns in chaotic non-linear systems that were previously hidden have been brought to light with computers.

Previously we investigated chaotic equations and plotted their screen images. Those equations were of the iterative form as are the equations we'll work with here. The main difference is that in these Mandelbrot equations we use complex numbers instead of real numbers.

Complex Numbers

A complex number is made up of two parts called real and imaginary. The number 9 + 3i is a complex number, with the 9 being the real part and the 3i the imaginary. The i next to the 3 shows which part of the number is imaginary. Complex numbers can be represented graphically by the point P whose rectangular coordinates are (x,y). (See figure 1.)

In this form we see the X axis is the axis of reals, and the Y axis the axis of imaginaries.

Plotting

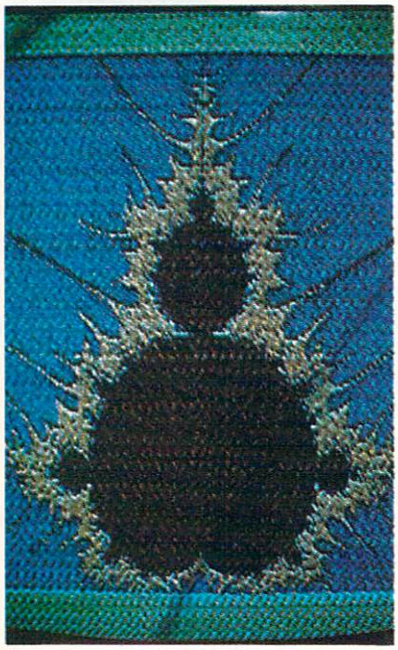
As stated the equation is of the iterative variety, and is functionally equivalent to the chaotic equations we worked on in "Dynamic Equations: The Beginnings of Fractals" (*Commodore Magazine,* April 1988).

$Z \rightarrow z^2 + c$

Starting with a seed value for Z, we square z and add c then feed this value of z back into the equation, square it, add c, and so forth and so on (Zn + 1). Remember, z and c are both complex numbers.

In figure 2 we have added another axis, the z axis. The z axis is equivalent to the c counting of iterations. It shows us how fast

In this iterative process some complex numbers become very large, exceeding the capacity of any computer; we treat these numbers as if they reach infinity. We shall see later how the computer program handles this. Many complex numbers remain small after many iterations. The number of iterations it took for the number to reach infinity determines what we color that particular coordinate. (See figure 2.)



In figure 2 we have added another axis, the z axis. The z axis is equivalent to the c counting of iterations. It shows us how fast a particular point escapes to infinity. For example, if a point (which is a complex number coordinate) takes four or less iterations to reach infinity it is colored with color #1. If the number of iterations it takes is greater than four but less than six, the point is colored with color #2. Colors are assigned to complex numbers that reach infinity depending on the number of iterations (C = count) it took.

For practical application see the section on Advanced Operations.

First Mandelbrot Picture

Our first Mandelbrot picture uses the standard coordinates— − 2.25 to .75 for the x dimension and -1.5 to 1.5 for the y dimension. The graphic screen resolution for the Commodore 64 and 128 is a maximum of 320 × 200. We will use the multi-color mode (160 × 200), however, to get some color into our pictures. Our coordinates are divided by the resolution (less 1) of our screen. Thus:

DX = (.75-(-2.25)) OR DX = 3.00/159(x res) = .0188679245
DY = (1.5-(-1.5)) OR DY = 3.00/199(y res) = .0150753769

These numbers DX and DY become our step values. In our first run through the equation the coordinates start at -2.25x and -1.5yi. The iterative process is repeated until we reach either infinity or we reach the maximal value that we assign to C to repeat the iterative equation.

Let's assume that for this first number we reached the threshold of infinity in three iterations. We take the number three and assign a color value to it, plot or draw the pixel to the screen. (See figure 2.) Using the standard coordinates for the pixel location -2.25, -1.5i is the upper left of the screen.

Now we increment the Y value by the step value, so the next coordinate pair is -2.25x and -1.485yi. We repeat the process as described, assign a color and draw the pixel. This pixel coordinate is one pixel down from the last. When we have stepped

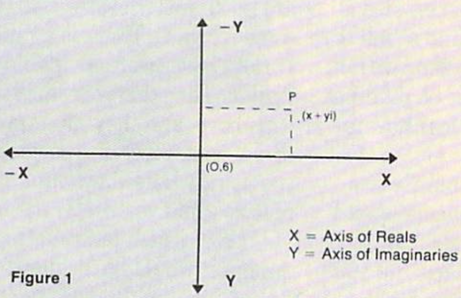


Figure 1

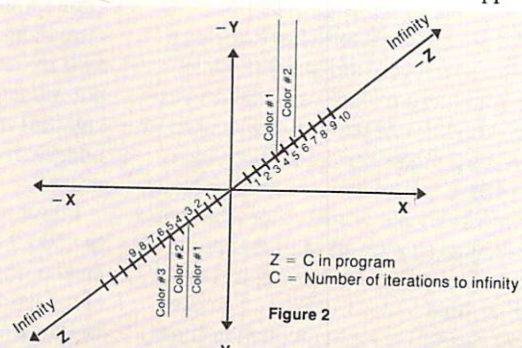


Figure 2

through the entire range of Y, we increment X by its step value and repeat for all the values of Y again.

The program I've written uses a variable CT as a maximal number to repeat the iterative process. CT is equal to 48 in the program (line 108), which means if the complex number doesn't reach infinity in 48 iterations, it is assumed to be lying within the Mandelbrot set, and the next number is checked.

As you can see, drawing the screen is a time-consuming and labor-intensive process. It should come as no surprise that it takes approximately eight hours to draw a picture in 128 fast mode.

Program Features

The program contains a number of useful features. Item 1 of the main menu is for looking at the disk directory to see picture files you have saved. Notice all the picture files have a ".PIC" appended to the file. This will help to remind you of picture filenames you've forgotten.

Item 2 first prompts you for the picture name, loads the picture and its coordinates then returns you to the main menu. The filename that you assign to your pictures will have ".PIC" appended to them. Do not include the ".PIC" when prompted for a filename, the program will do that for you automatically.

Item 3 puts the computer into a view mode to look at any Mandelbrot picture you have drawn. Pressing any key in view returns you to the main menu.

Item 4 prompts you for coordinates to create a new picture. There are many articles and books on fractals, and you may wish to try some coordinates you found elsewhere. Two excellent books are referenced in the Bibliography at the end of this article.

Item 5 puts the computer into a view mode, then by pressing the space bar changes the colors of the Mandelbrot set. You have 255 combinations of colors from which to choose. Pressing "Q" returns you to the main menu.

Item 6 is the most powerful feature of the program. When this item is selected the computer goes into the view mode and creates a moveable window on the screen. You can move the window anywhere on the screen with the following commands:

U for up
D for down
L for left
R for right

Whatever area lies under the window can be magnified by approximately ten times by pressing the "E" key. By pressing "E" the computer calculates the required coordinates, lists the coordinates, and prompts you if it should draw the coordinates, change coordinates or return to main menu. If you go ahead and draw, the section that laid under the window will now be enlarged to a full-screen image (magnified approximately ten times).

It is interesting to note before I leave this item that anyone using this function, say, eight or nine times in progression will in fact enlarge the original screen image to the size of the United States. It's also probable that after that many progressions you'd be exploring an area no one has ever seen before.

Item 7 saves the Mandelbrot picture and its respective coordinates to a disk file and will prompt you for the filename.

Program Operation

After you've typed and saved the program, start the program and choose item four from the main menu. Enter the first coordinates in table one. Answer the prompts to allow the program to draw this Mandelbrot picture. This can take about 12 hours so I advise you to start the program before you retire for the night, and it should be finished drawing by the morning. When the program finishes drawing a picture, it automatically returns to the main menu. Choose item 3 to see what you have drawn. After the drawing is complete save it to the disk using item 7 at the menu prompt.

To create additional drawings, from this point you can either enter coordinates using item 4, or you can load any .PIC file on the disk and explore it using item 6. Naturally any drawings you create with item 6 can also be saved and used as another starting point for your explorations.

Advanced operations

This program can be changed to go further and create more interesting work. The two main limitations are the variable CT (line 108) and the banding or transition numbers (lines 128 through 132). I have kept both pretty low to facilitate drawing speed. More interesting pictures can be had by increasing CT and changing the banding numbers.

Many Mandelbrot pictures are created by using a CT value of 1000. Be aware this can greatly increase your processing time. The banding numbers are another distinct area of experimentation. As a rule of thumb the greater the CT value the better the final resolution of the picture. If you increase the CT value, change the C values accordingly.

Classic Fractals

What we have to play with today are classic fractals. These geometric objects are already eight years old. New and more powerful fractals, the kinds that create realistic landscapes, planets and plants are the latest frontiers in fractal geometry. What I'm trying to say in a roundabout manner is that there is still much more that lies ahead beyond what we've covered. Julia sets, IFS graphics, self-organizing equations, . . . the fields are wide open.

Properties of Complex Numbers

There are two properties of complex numbers you need to know in order to perform algebraic operations:

1. When you square the symbol i it has the property of $i^2 = -1$
2. The conjugate of a complex number $x + yi$ is the complex number $x - yi$. Therefore, the conjugate of the complex numbers $9 + 3i$ and $4 - 7i$ are $9 - 3i$ and $4 + 7i$.

I will not go further into any other properties or reasons for the above properties. If you are interested you can purchase a mathematical textbook on the subject.

Algebraic Operations

In order for our program to work we must be able to perform mathematical operations. These are not difficult as the following examples will prove:

1. Addition. To add two complex numbers, first add the real parts then add the imaginary parts.

Ex. 1 $(9 + 3i) + (4 - 7i) = (9 + 4) + (3 - 7)i = 13 - 4i.$

Ex. 2 $(7 + 2i) + (3 + 4i) = (7 + 3) + (2 + 4)i = 11 + 6i.$

2. Subtraction. To subtract two complex numbers, first subtract the reals then subtract the imaginaries.

Ex. 3 $(9 + 3i) - (4 - 7i) = (9 - 4) + [3 - (-7)]i = 5 + 11i.$

Ex. 4 $(7 + 2i) - (3 + 4i) = (7 - 3) + (2 - 4)i = 4 - 2i.$

3. Multiplication. To multiply two complex numbers , multiply as if they are ordinary binomials. Then replace i^2 by -1.

Ex. 5 $(9 + 3i)(4 - 7i) = 36 - 51i - 21i^2 = 36 - 51i - 21(-1) = 47 - 51i$

Ex. 6 $(7 + 2i)(3 + 4i) = 21 + 34i + 8i^2 = 21 + 34i + 8(-1) = 13 + 34i$

4. Division. To divide two complex numbers, first take the conjugate of the denominator and multiply both numerator and denominator.

Ex. 7

$$\frac{(9 + 3i)}{(4 - 7i)} = \frac{(9 + 3i)(4 + 7i)}{(4 - 7i)(4 + 7i)} = \frac{15 + 75i}{16 + 49} = \frac{15}{65} + \frac{75}{65}\,i$$

Note the form of the result is neither $\frac{15 + 75i}{65}$ nor $\frac{1}{65}(15 + 75i)$.

Computer Choke

If we attempt to plug in a complex number into our program, the computer will choke on it. We must rewrite the complex number in a manner that the computer can work with.

Our basic iterative function is $Z \rightarrow z^2 + c$ where both z and c are complex numbers. We must reduce z and c to their real and imaginary parts, thus $z = x + yi$, and $c = p + qi$. Our iterative function now looks like this:

x1 = x*x-y*y+p   y1 = 2*x*y+q

See program lines 114 to 122 for complete breakdown.

Table 1

XL	XR	YT	YB
-2.25	.75	-1.5	1.5
.193396226	.636792453	.173366834	.203517588
.299365136	.366292868	.0578394484	.0104921592

Bibliography

The Beauty of Fractals
H. Peitgen & P. Richter

The Fractal Geometry of Nature
Benoit Mandelbrot
W.H. Freeman & Co., NY

*[**Editor's Note:** Next month we'll print the Commodore 128 version of Mandelbrot.]*

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

Mandelbrot 64

```
14 FOR N=896 TO 958:READ A:POKE N,A
   :NEXT'GOMH
16 DATA 255,255,255,128,0,1,128,0,1,
   128,0,1,128,0,1,128,0,1,128,0,
   1'BJYO
18 DATA 128,0,1,128,0,1,128,0,1,128,0,
   1,128,0,1,128,0,1,128,0,1,128,0,
   1'BNLR
20 DATA 128,0,1,128,0,1,128,0,1,128,0,
   1,255,255,255,255,255,255'BFHJ
22 HP=160:VP=100:POKE 2040,14'DTSG
24 POKE 49500,18'BIUE
26 POKE 53272,21:POKE 53265,27
   :POKE 53270,200'DCKL
28 REM MANDELBROT PROGRAM C-64'BVEM
30 REM JOHN IOVINE'BKKC
32 PRINT"[CLEAR]":PRINT"[DOWN2]
   MANDELBROT PROGRAM C-64 MAIN MENU"
   :PRINT'DCWM
34 PRINT" 1) VIEW DIRECTORY"'BAGI
36 PRINT" 2) LOAD MANDELBROT
   PICTURE"'BAYM
38 PRINT" 3) VIEW MANDELBROT
   PICTURE"'BACO
40 PRINT" 4) INPUT COORDINATES"'BAAG
42 PRINT" 5) CHANGE COLORS"'BAUG
44 PRINT" 6) VIEW & CREATE MANDELBROT
   PICTURE"'BANN
46 PRINT" 7) SAVE MANDELBROT
   PICTURE"'BATN
48 PRINT" 8) QUIT"'BAFK
50 INPUT"MENU CHOICE 1 THUR 8";A'BCDH
52 IF A <0 THEN 58'DETF
54 IF A>8 THEN 58'DEAH
56 ON A GOTO 268,246,282, 60,152,170,
   226,168'CGDO
58 PRINT"ERROR, PLEASE ENTER NUMBER
   BETWEEN 1-8":GOTO 50'CDQU
60 PRINT"[CLEAR] [DOWN2]
   ENTER NEW COORDINATES.."'BATJ
62 INPUT"INPUT XL";XL:INPUT"INPUT XR";
   XR'CHUL
63 INPUT"INPUT YT";YT:INPUT"INPUT YB";
   YB'CHIM
64 PRINT"[CLEAR] ARE THESE THE
   COORDINATES YOU WANT"'BAXQ
66 PRINT"XL = ";XL:PRINT"XR = ";XR
   :PRINT"YT = ";YT:PRINT"YB = ";
   YB'EPQT
68 INPUT"( Y/N OR M FOR MENU)";A$'BDFQ
70 IF A$="Y"THEN 78'DESG
72 IF A$="N" THEN 60'DEDH
74 IF A$="M" THEN 26'DEEJ
76 GOTO 68'BCVJ
78 PRINT"[CLEAR]"'BATM
80 PRINT"[DOWN2]ENTER 1 TO PROCEED TO
   DRAW"'BAXL
82 PRINT"[DOWN2]ENTER 2 TO RETURN TO
   MENU"'BAVN
84 INPUT"INPUT 1 OR 2";A'BCDL
86 IF A=1 THEN 94'DETM
88 IF A=2 THEN 26'DEPO
90 PRINT"ANSWER 1 OR 2 ONLY"
   :GOTO 84'CDHL
92 REM COORDINATES'BLBK
94 DX=(XR-XL):DY=(YB-YT)'ERAQ
96 POKE 53265,PEEK(53265)OR 32
   :POKE 53270,PEEK(53270)OR 16'GGEV
98 POKE 53272,PEEK(53272)OR 8'DOUR
100 FOR I=8192 TO 16191:POKE I,0
    :NEXT'FPOB
102 FOR I=1024 TO 2023:POKE I,16+2
    :NEXT'GQRD
104 POKE 53280,0'BHTA
106 POKE 53281,3'BHXC
108 BA=8192:SM=3:CT=48'DPHI
110 FOR X0=XL TO XR STEP(DX)/159'FNRC
112 FOR Y=YT TO YB STEP(DY)/199'FMTE
```

Continued on page 68

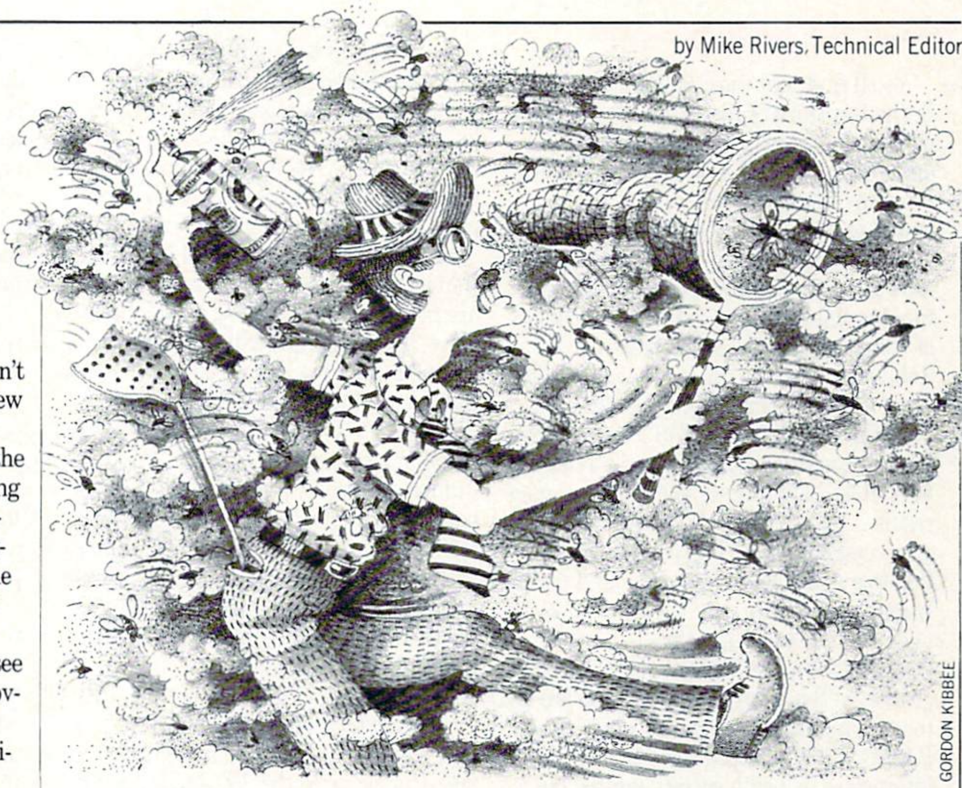
Continued from page 66

```
114 A=XØ*XØ-Y*Y+XØ:B=2*XØ*Y+Y:C=Ø'KTDL
116 R=A*A-B*B+XØ:I=2*A*B+Y:C=C+1'LRIN
118 A=R:B=I'CFMG
120 IF R<-1Ø^16 THEN 134'FIOB
122 IF R<SM THEN IF C<CT THEN 116'GJUF
124 X1=INT((XØ-XL)/((DX)/159))'FTJI
126 Y1=INT((Y-YT)/((DY)/199))'FSCK
128 IF C<4 THEN GOSUB 144
    :GOTO 134'FJUJ
130 IF C<6 THEN GOSUB 146
    :GOTO 134'FJYC
132 IF C<48 THEN GOSUB 148'EGOD
134 IF X1=>158 THEN 15Ø'EIGG
136 NEXT Y,XØ'BERF
138 X=2*X1'CEMI
14Ø RO=INT(Y1/8):CH=INT(X/8)
    :LN=Y1 AND 7:BI=7-(X AND 7)
    :BY=BA+RO*32Ø+CH*8+LN'RSHV
142 POKE BY,PEEK(BY)OR 2^BI
    :RETURN'FLNG
144 X=2*X1-1 :GOSUB 14Ø:RETURN'FKMI
146 GOSUB 138:RETURN'CEPG
148 GOSUB 138:X=X-1:GOSUB 14Ø
    :RETURN'FMVM
15Ø GOTO 26'BCPA
152 REM CHANGE COLORS'BMHG
154 POKE 53265,PEEK(53265)OR 32
    :POKE 5327Ø,PEEK(5327Ø)OR 16'GGEO
156 POKE 53272,PEEK(53272)OR 8'DOUK
158 FOR X=1 TO 255'DFBK
16Ø FOR I=1Ø24 TO 2Ø23:POKE I,X
    :NEXT I'FPFH
162 GET K$:IF K$=""THEN 162'EIDH
164 IF K$="Q"THEN POKE 495ØØ,X
    :GOTO 26'FMLK
166 NEXT X'BBRH
168 END'BACJ
17Ø POKE 65Ø,128'BHXD
172 VIC=53248:POKE VIC,HP
    :POKE VIC+1,VP :POKE VIC+39,
    13'GHBP
174 POKE 53265,PEEK(53265)OR 32
    :POKE 5327Ø,PEEK(5327Ø)OR 16'GGEQ
176 POKE 53272,PEEK(53272)OR 8'DOUM
178 X=PEEK(495ØØ)'CIFN
18Ø FOR I=1Ø24 TO 2Ø23:POKE I,X
    :NEXT'FOIJ
182 POKE VIC+21,1'CHBH
184 GET A$'BCGI
186 IF A$=""THEN 184'DFEL
188 IF A$="L"THEN HP=HP-1
    :GOTO 214'GLXR
19Ø IF A$="R"THEN HP=HP+1
    :GOTO 214'GLDK
192 IF A$="U"THEN VP=VP-1
    :GOTO 22Ø'GLHM
194 IF A$="D"THEN VP=VP+1
    :GOTO 22Ø'GLOO
196 IF A$="E"THEN 2ØØ'DFHN
198 GOTO 184'BDMN
2ØØ HP=HP-24:HP=HP/2:VP=VP-5Ø'GTDF
2Ø2 DX=(XR-XL):DY=(YB-YT)'ERAF
2Ø4 XR=(XL)+((HP+24)*(DX/159))
    :XL=(XL)+((HP)*(DX/159))'JQTP
2Ø6 YB=(YT)+((VP+21)*(DY/199))
    :YT=(YT)+((VP)*(DY/199))'JQQR
2Ø8 POKE VIC+21,Ø:POKE VIC+39,Ø'EPHK
21Ø POKE 53272,21:POKE 53265,27
    :POKE 5327Ø,2ØØ'DCKE
212 GOTO 64'BCRY
214 SF=(HP>255)'CJDE
216 POKE VIC,HP+(SF*256)'DNAI
218 POKE VIC+16,SF*(-1)'ELOK
22Ø POKE VIC+1,VP'CHMB
222 GOTO 184'BDMB
224 POKE VIC+1,VP'CHMF
226 REM SAVE COORDINATES & BINARY
    PIC'BAQL
228 PRINT"[CLEAR]"'BATH
23Ø PRINT"[DOWN4]":INPUT"FILENAME";
    F$'CEMD
232 OPEN 1,8,2,"@Ø:"+F$+".NUM,S,
    W"'DIFH
234 PRINT#1, XL:PRINT#1, XR'CJNG
236 PRINT#1, YT:PRINT#1, YB'CJHI
238 CLOSE 1'BBIH
24Ø SYS 57812F$+".PIC",8
    :POKE 173,8192/256'EVYH
241 POKE 172,8192-PEEK(173)*256
    :POKE 78Ø,172'FYJJ
242 POKE 782,16191/256:POKE 781,
    16191-PEEK(782)*256:SYS 65496'HLUN
244 GOTO 28'BCRE
246 REM LOAD COORDINATES & BINARY
    PIC'BABN
248 PRINT"[CLEAR]":PRINT"[DOWN3,
    RIGHT3]"'CBMK
25Ø INPUT"FILENAME";F$'BDOE
252 OPEN 3,8,3,F$+".NUM,S,R"'CIWH
254 INPUT#3,XL,XR,YT,YB'BNCI
256 CLOSE 3'BBKH
258 POKE 53265,PEEK(53265)OR 32
    :POKE 5327Ø,PEEK(5327Ø)OR 16'GGET
26Ø POKE 53272,PEEK(53272)OR 8'DOUG
262 FOR I=1Ø24 TO 2Ø23:POKE I,18
    :NEXT'FPZK
264 LOAD F$+".PIC",8,1'CGRJ
266 END'BACI
268 REM DIRECTORY'BJRN
27Ø PRINT"[CLEAR]"'BATE
272 SYS 57812"$",8:POKE 43,1
    :POKE 44,192:POKE 768,174
    :POKE 769,167:SYS 47ØØ3,1'GSRR
274 POKE 782,192:SYS 65493:SYS 42291
    :LIST:POKE 44,8:POKE 768,139
    :POKE 769,227'HQVT
276 PRINT:PRINT:PRINT"PRESS ANY KEY
    TO CONTINUE"'DCHS
278 GET K$:IF K$=""THEN 278'EILP
28Ø GOTO 28'BCRE
282 POKE 53265,PEEK(53265)OR 32
    :POKE 5327Ø,PEEK(5327Ø)OR 16'GGEQ
284 POKE 53272,PEEK(53272)OR 8'DOUM
286 X=PEEK(495ØØ)'CIFN
288 FOR I=1Ø24 TO 2Ø23:POKE I,X
    :NEXT'FOIS
29Ø GET K$'BCQG
292 IF K$=""THEN 29Ø'DFMJ
294 GOTO 26'BCPJ
```

END

by Mike Rivers, Technical Editor

A Beginner's Guide to Debugging



The idea of fixing a program that won't run can be a daunting task to the new user. Debugging does have its rewards though; few feelings can compare with the triumphant elation that goes with setting a program bug to rest. After a programmer becomes proficient at simple debugging, it's not uncommon to find the same programmer who was once so fearful of "doing something wrong" introducing bugs into their code on purpose "just to see what happens." It is at this point the novice graduates to full-fledged "hacker."

This article is a compendium of practical advice to help the new user get the most out of programming and debugging on the Commodore 64 or 128. So if you're a new user, first time programmer, or someone who is just typing in a program, read on. Even if you're an old-timer, you may pick up a new trick or two.

When entering code, it is a particularly good idea to keep your system guide handy and to use it frequently. Familiarize yourself with the contents page, the index, and appendices by skimming over them once in a while. Don't worry about retaining any information, as you use your reference guide, its contents will become second nature. Perhaps the two most important sections to be able to find quickly are the BASIC commands and the error messages. Referring to these can readily bring insight to the problems involved with programming and debugging.

A common problem for beginners is not fully understanding an error message. By looking up the description of an error message in the system guide appendix you can usually get a clearer idea of where to look for the cause of a problem.

Make frequent backups of the program you are working on. When debugging, I like to work on one of several copies of the original in case I try something really exotic that results in a system crash. That way I can always take one step back and start over without going all the way back to square one.

Let's take a look at some everyday coding and programming problems. The most frequently encountered error message for any programmer is the SYNTAX ERROR message. This message is triggered primarily by typing errors which produce code that cannot be interpreted by BASIC. They usually take the form of a misspelled command (e.g., POOK instead of POKE), the letter "O" where a zero should be, or a semicolon in place of a colon.

Fortunately, syntax errors also provide the line number which caused the error. If you have trouble seeing where a syntax error is in a particular line, try entering that line again from scratch. Sometimes we see code as correct when it is not, and this is one exercise that may fix things if you run out of alternatives.

A difficult syntax error to deal with is one which occurs in a user-defined function (DEF FN), if there is an error in the function, the error message will reference the line that called the function and not the definition statement. Syntax errors can be avoided by carefully entering each line of a program and having some familiarity with the BASIC commands you are using. Once again, a working knowledge of these commands can be acquired in a relatively short time by reading the sections of the user guides that deal with BASIC.

Another common class of bugs is known as procedural errors. This occurs when the program syntax is correct, but the program is attempting to do something which is not allowed. Like syntax errors, procedural errors generate error messages that refer to a line number in the program. They are a little harder to fix because the reasons for the error are not easy to detect. For example, An ILLEGAL QUANTITY error may be caused by poking a memory location with a value less than zero or greater than 255. The value may have been calculated by another line in the program, but the line referred to in the message is the one that tried to use that value. To fix the bug, you fix the line which made the calculation.

OUT OF DATA error is another common error. Encountering it means that a READ statement has run out of data to read. Several things can cause an OUT OF DATA error: a missing data statement or line of data; a FOR/NEXT loop incrementing beyond the amount of data to be read; missing commas or a period where a comma should be; or accidentally re-executing a READ command without restoring the data.

Long data lists can be a source of frustration to any programmer. Looking for bad data items in a seemingly unending list can drive you "buggy." To find the "needle in a haystack" I recommend reading the data from bottom to top, from right to left, or in columns. Don't forget to look for periods that should be commas, missing commas, and the letter "O" masquerading as a zero. Reversed numerals are very easy to produce no matter how alert and rested you are. Depending on what the data is used for, typing 02 instead of 20 can have disastrous effects on program execution.

You'll find that most of the errors occur in the last third of the data near the ends of the lines. Some good advice to remember is pace yourself. Don't try to get a 10K program entered in one sitting. You're bound to make mistakes somewhere. For example, forgetting to type in a line of code can cause interesting problems. A missing line can cause a variable or series of variables to assume incorrect values. Subroutines can be missed entirely or entered without being called, resulting in a RETURN WITHOUT GOSUB error. Similar conditions can produce a NEXT WITHOUT FOR error. The most common result is an UNDEFINED STATEMENT error, caused by one line passing execution to a nonexistent line number. I usually enter a program over the span of several days a few lines at a time.

One of the most difficult types of bug to go after is the analytic error. These are errors of program design and logic which BASIC will not detect. That is, the code is interpreted as using correct syntax, but it does not execute properly. For example, in the following program, two variables are used to calculate a quotient.

```
10 A=9
20 B=5
30 C=B/A
40 A=A-1:B=B-1
50 IFB<1 THEN END
60 GOTO 20
```

At each increment of the loop, one of the variables is tested to see if it is less than one. The GOTO statement points to the wrong line number, and the variable to be tested always assumes the same value. The other variable which is in the divisor continues to decrement until it equals zero, triggering a DIVISION BY ZERO in line 30.

The bug is actually in line 60, the GOTO should point to line 30. Similar types of coding mistakes can cause a program to run without any errors only to produce incorrect results. It's a good idea to step through the related parts of the program mentally or on paper to find the point at which the calculations went awry.

Once in a while you'll try to run a program and nothing happens. The screen goes blank or sits there doing nothing. That's an indication that the program may be caught in a loop or could have crashed altogether. The text color could have changed to the background color making error messages invisible. The recommended procedure for dealing with this is to press RUN/STOP and RESTORE simultaneously. This should halt the program and print the number of the last line executed. Remember that number or write it down. It's a good place to start looking for bugs. If that doesn't work and the machine is really locked up, you may have to reset it and start over using your most current version of the program.

Suppose you want to test a line of code that contains several statements, and you are not sure which one is causing problems. To debug lines with multiple statements, it may become necessary to break the line up into single statements. A quick way to do this is to duplicate the entire line by typing over the existing line number with new *nonexistent* line numbers according to however many statements you want to isolate. Then, collapse the new lines into ones containing single statements by using the cursor and DELETE keys. For example, suppose you have a line that reads:

```
250 X=X1+1: FOR Q=1 TO 100: PRINT
Q: NEXT: GOSUB 600: B=24
```

and the next consecutive line number is 260. Cursor up to the 250 and type 252 and press RETURN. Cursor up again and type 254 and press RETURN. Cursor up a third time and type 256 and RETURN. The line has now been duplicated three times. List 250-260 and you'll see them. Then cursor up to each line and remove the extra statements with the space bar, taking care to press RETURN when finished with each line. Your code should now look like this:

```
250 X=X1+1
252 FOR Q=1 TO 100: PRINT Q: NEXT
254 GOSUB 600
256 B=24
```

Be careful though, this can introduce wonderful new bugs, especially if you're the type who programs until after midnight and then wakes up with your screen full of Z's and keycap imprints on one side of your face.

If your bugs persist after a few preliminary tries at debugging, it's a good indication that you should generate a printout of the program. A printout makes a good roadmap and cuts down on the amount of listing to the screen you have to do. To generate a printout, first make sure your printer is properly connected and has paper in it. Then, in direct mode, open a data channel to the printer by typing OPEN 4,4 and press RETURN. Type CMD 4:LIST and press RETURN to redirect screen output to the printer and to list the program to the printer.

Using a printout to debug is an art in itself. I like to keep several different colored highlighters handy. First, I highlight variables, where they change values, function definitions, function calls, and anything that redirects program flow. I'll use yellow for GOTOs, GOSUBs, and IF-THEN branches. Then, I follow the GOSUBs to where they start and highlight the line numbers until I find the RETURN statement that should be at the end of the subroutine. Then, I'll connect nested subroutines with a fine red marker (by this time things are becoming fairly obvious as to what calls what). Nested loops are offset in similar fashion. After doing all this, you get a much better idea of how the program is structured, which is invaluable when debugging. After a while, you won't need the highlighters at all, you will know intuitively how to make sense out of a program listing.

Here are a few more advanced techniques you can use. The STOP command, when placed in a program, allows you to stop program execution at a specific point, while leaving the variable values intact, and then restart the program by typing CONT (short for "continue"). If things get really confusing and you need that extra degree of control, judicious use of the STOP command can help you test parts of the program and print "active" variables one section at a time.

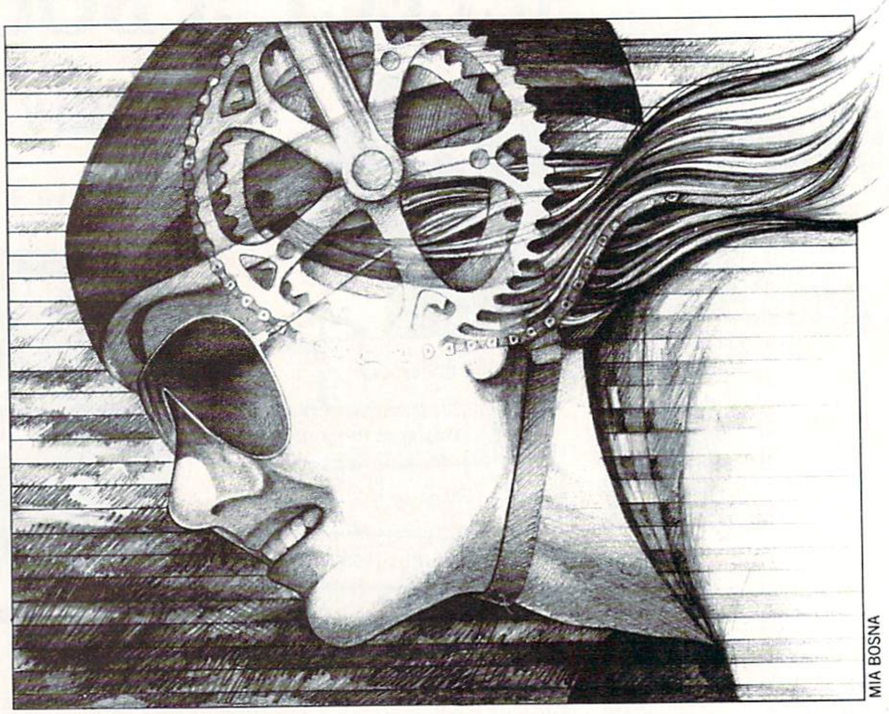
For example, you can place the STOP command before IF-THEN conditionals and after FOR-NEXT loops. By running the program from a particular line number, the code between the line number and the STOP command is executed, and the values of the variables involved can be examined using PRINT in direct mode. You can look at numeric variables, string variables and subscripted variables. By typing CONT, the program will execute until the next STOP statement is encountered and the variables may be checked again.

When a line becomes particularly troublesome, try disabling the line with a REM statement. At times, this can give clues or reveal related problems. You may also find the line isn't needed at all. For those of you who have a 128 or Simon's BASIC cartridge for the 64, there is a trace function that prints to the screen the line number that is currently executing. This provides a useful way of seeing where the program has been while running and can provide clues to where problems can arise.

Of course, there are lots of more sophisticated techniques programmers use to debug programs. The ones mentioned here should provide the beginner with enough tools to tackle most (if not all) of the bugs you might come across. ■

by John K. Lunde

Bikegear
for the Commodore 64



One thought that comes to most cyclists sooner or later is that they can improve on the gearing their bicycle was sold with. From this comes much mischief.

Not that the idea's a bad one. Bicycle manufacturers build for a mass market, and the gearset that comes with a bike is a compromise—one that sometimes doesn't seem to show much effort. On many "ten speed" bikes, for instance, only seven gears are usefully different from one another.

But knowing an improvement can be made and making it are two different things. Gearing is a tricky proposition because so many factors are involved that any one change can cause several unwanted side effects. Trickiness aside, the mass of calculations needed to evaluate even one gearset may make the cyclist quit short of the best solution.

First, some definitions: The rate at which a cyclist turns the pedals is called "cadence"; the pedals are mounted on "crankarms," which turn the "chainwheels," or front sprockets. These drive the chain, which rotates the "cogs," or rear sprockets. The cogs turn the wheel, moving the bicycle forward.

Crankarms are measured in millimeters, or very rarely in inches; chainwheels and cogs are both described in "teeth," and wheel diameter can be in either millimeters or inches.

The unit of measurement for bicycle gears is the "gear inch," an oddity that reflects bicycle design a century ago. The "high-wheeler" bikes of the time had large front wheels which were turned once by each turn of the pedals: the bigger the wheel, the faster the bike went. To say that a modern bicycle has a "gear" of 100.3 gear inches simply means that for each turn of the pedals it moves forward as far as a high-wheeler with a front wheel 100.3 inches in diameter would.

Bicycles today have many gears, or "speeds." This is done with a "derailleur," which moves the chain from one cog or chainwheel to the next. The exact "gear" depends on the relative size of the chainwheel and cog in use at the moment. On bikes with both multiple chainwheels and multiple cogs, there's a derailleur at each end of the drivetrain.

Designing any one gear is easy. Say that you know you're comfortable at a cadence of 72 rpm plus or minus 10% and want to cruise in top gear at 20 mph. That's 20 × 17.5 inches per second, so the gear needs to be ((20 × 17.5) × (60/72))/pi, or about 93 gear inches. By checking a "gear table," you'll find that a 45-tooth chainwheel and a 13-tooth cog are needed.

This will give you a speed range of 18 to 22 mph in top gear, so the next lower gear should give you a speed range of from, say, 15 to 18 mph, the one below that from 12 to 15 mph and so on until you've got a gear for every speed range from a walking pace on up. Unfortunately, you'll run out of cogs long before you get to the low gear you need for hills.

The next step is to add a second, smaller chainwheel to get the lowest gear; but since each chainwheel is used with all the cogs, you now have a whole new set of gears to calculate. When you're done, you may find that the new gears don't overlap the original set very usefully, at which point you start over. Or quit.

When you consider that gear tables don't give accurate solutions except for a standard wheel diameter, that a rider's ideal cadence can change over time and that some sizes of cogs and chainwheels simply aren't available or won't work with some derailleurs, you'll see what a morass gearing can turn into. The whole process is so involved that most cyclists don't even try to calculate speed ranges. Instead they aim for the lowest gear they think they'll need, the highest gear they can pull and try to eyeball a reasonable spread in between.

All of which makes gearing an ideal subject for a program. Bikegear takes only a few seconds to calculate speed ranges for an entire "suit" of gears, defines the derailleurs needed and lets you adjust the results until you have an exact solution.

Using Bikegear

LOAD and RUN Bikegear. Once the program's initialized, you'll see a line of labels and asterisks down the left side of the screen; the asterisks show where the chainwheel and cog data go.

Enter the number of teeth for each chainwheel or cog and press RETURN. The cursor will move to the next line, skipping the label "Cog" and stopping on the last "Cog" entry.

Bikegear will handle anything from one to 21 speeds, so don't worry if some asterisks are left over; it's also indifferent to the order in which data are entered.

If you make a mistake, just move the cursor and re-type the character. If you discover the error after you've already "entered" the line, use the up and down cursor keys to go back and type in changes. The up and down cursor keys will only work when the cursor's in the first column.

Now, press F1. The word "working" will appear for a few seconds, then a bar graph will be printed that shows the overlap of

the gear combinations you've entered. Each bar shows the lowest and highest speed a gear combination will produce if you're pedalling at the rate shown under "Cad" plus or minus the amount under "Var"; using the preset values, that's 72 rpm +/- 10%.

By comparing the bars, you can tell if the suit of gears gives you a continuous flow of energy to the ground or if some of the combinations uselessly duplicate each other.

To change any entry, just type the new information over the old. When you've changed what you want to, press F1 again and evaluate the new results. I can't tell you what results to look for, because the ideal varies with the conditions you ride under, but generally an even spread of gears works best for flat terrain. Riding on hills needs an extra-low gear even if you have to put up with a few duplicate combinations to get it.

Because of rounding-off errors, the bar graph isn't accurate to more than a few tenths of a mph. Where the speed range for a gear combination is very small it becomes hard to plot using low-resolution graphics, so an asterisk is printed in its place.

If you want to see the same information that's on the graph displayed as a table, press F3. The "table" also shows gear inches to the nearest tenth. You can enter data on the table just as you did with the graph display and get the results back in tabular form by pressing F3 instead of F1. Pressing F1 returns you to the graph.

Pressing F5 from either display will give you the derailleur requirements for the suit of gears; front and rear derailleur capacities, jumps between gears and the takeup requirement. It also calculates the shifting sequence.

Finally, F7 combines all three displays into a single hard copy and lets you title it if you want. The bar graph on the hard copy is quite accurate.

Changes in display mode are immediate unless you've entered new data; in that case, the mode happens after the new data have been "worked."

The parameters located below the "Cog" entry lines are preset to "reasonable" values that can be changed by typing new values over them. These parameters are "Cad," "Var," "Crk" and "Whl" and represent cadence, percent variation in cadence, crankarm length and wheel diameter, respectively. The preset values are 72 rpm plus or minus 10%, 170mm crankarms and a 27-inch diameter wheel. To change any of these items, cursor down to the line and enter the change.

The crankarm and wheel diameter entries sense whether the input is in millimeters or inches based on its magnitude. A crankarm length of up to 250 is assumed to be in millimeters, while anything more is treated as being in hundredths of an inch. An entry of "675," for instance, represents a crankarm of 6.75 inches long.

Conversely, a wheel diameter up to 360 is considered to be in tenths of an inch, and anything larger to be in millimeters.

If the preset values for "Crk" and "Whl" are used, the resulting gear inch values will match those from standard gear tables. Changing the wheel diameter changes both the gear inch and speed range results. Changing the crankarm length alters the gear inch result to show the effective gear inches in terms of effort but leaves the speed range the same.

You can clear out any one chainwheel or cogset entry by entering an asterisk in the first space on that line, or all the entries at once by pressing F2; using F2 leaves any changes you've made in the parameters intact.

There are some limits on entries: chainwheel and cog values must be from ten to 99, and variation between zero and 100. Cadence, crankarm length and wheel diameter can be from ten to 999. If you try to enter other values (or non-numbers), the entry will be erased and the prior value substituted. In addition, any computation that results in gear inches greater than 999 or a speed of more than 99 mph will return only the input values and no results after "working." This keeps the results from running off the "table" display.

A final note: You can get a moderate increase in speed by compiling the program, but some compilers treat line 105 as a syntax error. The line isn't needed in a compiled version, so you can erase it or REM it out. C

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

Bikegear 64

```
105 DIM X,Y,T,Q,P,A,B,D,S,F,L,K,G,E,C,
    T$,G$,H$,A$,B$'BTEK
110 DIM B$(25),C$(22),F(13),G(21),
    E$(9),D$(9),I$(1)'BSUE
115 DIM A(24),B(24),C(24),E(20,1),
    V$(25),J$(13):POKE 53280,3'CWPL
120 POKE 53281,3:PRINT"[UNLOCK,
    LOWER CASE,LOCK,CLEAR,BLACK,
    DOWN10]"'CIKB
125 PRINT"[SPACE7]'[SHFT B]
    IKEGEAR' FOR THE [SHFT C]-64";
    'BBGK
130 PRINT SPC(67)"BY"SPC(73)"[SHFT J]
    OHN [SHFT K].[SHFT L]UNDE"'DGRG
135 O=54272:H=.002975:K=999
    :R$=CHR$(13)'FCSM
140 FOR X=1 TO 33:B$=B$+" ":NEXT
    :I$(0)="[BLACK]":I$(1)="[BLUE]
    "'IWEJ
145 V$(0)="[CLEAR,BLACK,SPACE4,DOWN2,
    RVS] [SHFT D]ATA [SHFT C]W/
    [SHFT C]G"'BFML
150 V$(0)=V$(0)+"[SPACE3,SHFT G]EAR
    [SPACE5,SHFT L]O-[SHFT M,SHFT P,
    SHFT H]-[SHFT H]I[SPACE2]"'CKPL
155 T$="[SPACE4,CMDR G,SPACE4,SHFT -,
    SPACE5,SHFT -]"'BCSK
160 T$=T$+"[SPACE8,SHFT -,SPACE12,
    CMDR M]"'CEGH
165 K$=MID$(T$,10):FOR X=1 TO 21
    :V$(X)=T$:NEXT'HXDP
170 T$="[CMDR T34,HOME]"'BCFA
175 V$(22)="[SPACE4]"+T$
    :V$(23)="[CMDR T5]"+T$+"[DOWN]
    "'FRAR
180 FOR X=0 TO 4:READ E$(X):NEXT
    :FOR X=0 TO 4:READ D$(X):NEXT'KVYN
185 FOR X=1 TO 14:E(X,0)=10:E(X,1)=99
    :NEXT:E(14,1)=K'HHET
190 E(16,1)=100:E(18,1)=K:E(20,0)=10
    :E(18,0)=10:E(20,1)=K'FXFR
195 F(5)=100:F(13)=100:FOR X=0 TO 78
    :U$=U$+"[SHFT *]":NEXT'ICWU
200 READ B$(0),B$(1):FOR X=13 TO 21
    :READ B$(X):NEXT'GYLE
205 FOR X=0 TO 5:READ F$(X):NEXT
```

```
:N$=" N/A"'GNXI
210 U=1:G=0:FOR X=2 TO 12
    :B$(X)="*[SPACE2]":NEXT'HRLF
215 B$(5)="[BLUE,SHFT C]OG[BLACK]"
    :GOTO 335'CJIH
220 PRINT"[HOME,RVS,BLACK,SHFT W]
    ORKING[RVOFF]":K=VAL(B$(20))
    /10'EMDG
225 IF K>36 THEN K=K*.3937'FKRI
230 L=VAL(B$(18)):IF L>250 THEN
    L=L*.254'HURH
235 L=170/L:B=1:D=5:A=0:FOR X=2 TO 4
    :F(X)=100'JBJP
240 IF VAL(B$(X))THEN F(X)=VAL(B$(X))
    :B=B+1'HWDJ
245 B$(X)="*[SPACE2]":NEXT
    :ON B GOTO 285:FOR X=2 TO 4
    :FOR Y=X TO 4'KTAP
250 IF F(X)>F(Y)THEN T=F(Y):F(Y)=F(X)
    :F(X)=T'GDCL
255 NEXT Y,X:FOR X=2 TO B
    :B$(X)=RIGHT$(STR$(F(X)),2)
    :NEXT'IYKQ
260 FOR X=6 TO 12:F(X)=100'EMBH
265 IF VAL(B$(X))THEN F(X)=VAL(B$(X))
    :D=D+1'HWHQ
270 B$(X)="*[SPACE2]":NEXT
    :ON-(D=5)GOTO 285:FOR X=6 TO
    12'JTEN
275 FOR Y=X TO 12:IF F(X)>F(Y)THEN
    T=F(Y):F(Y)=F(X):F(X)=T'JIOV
280 NEXT Y,X:FOR X=6 TO D
    :B$(X)=RIGHT$(STR$(F(X)),2)
    :NEXT'IYQO
285 G=(B-1)*(D-5):ON-(G=0)GOTO 335
    :FOR X=2 TO B'LVVU
290 FOR Y=D TO 6 STEP-1
    :G(A)=(F(X)/F(Y))*K'IUYO
295 C$(A)=B$(X)+"/"+B$(Y):A=A+1
    :NEXT Y,X:A=A-1'ICVV
300 FOR X=0 TO A:FOR Y=X TO A
    :IF G(X)=<G(Y)THEN 310'KTHH
305 T=G(Y):G(Y)=G(X):G(X)=T:T$=C$(Y)
    :C$(Y)=C$(X):C$(X)=T$'GWIQ
310 NEXT Y,X:X=VAL(B$(14))
    :Y=VAL(B$(16))/100'GBOH
315 S=(X-X*Y)*H:F=(X+X*Y)*H
    :X=NOT(F*G(A)>99 OR
    L*G(A)>999)'PJKV
320 G=G*(-X):ON-(G=0)GOTO 335
    :FOR X=0 TO A:T=G(X)'LXSL
325 A(X)=INT(.5+L*T*10)/10
    :B(X)=INT(.5+S*T*10)/10'MEJS
330 C(X)=INT(.5+F*T*10)/10:NEXT'HPFH
335 IF U THEN U=0:ON J+1 GOTO 600,345,
    700,515'GVFN
340 ON J+1 GOTO 615,350'DJIE
345 P=0:N=5:E=8:FOR X=0 TO 22
    :PRINT V$(X):NEXT'IUJP
350 X=0:PRINT"[HOME,SPACE7,DOWN2]"
    :IF G=0 THEN 375'FJKI
355 FOR X=0 TO A:PRINT TAB(5)"[BLACK]
    "B$(X+1)I$(-P)TAB(10);'IVQR
360 PRINT C$(X)"[RIGHT,SPACE6,RIGHT3,
    SPACE12,UP]"R$TAB(16);'CLKJ
365 PRINT A(X)TAB(25)B(X)TAB(32);
    :IF F-S THEN PRINT C(X);'HXYR
370 PRINT:P=NOT P:NEXT:IF X>19 THEN
    380'HLDL
375 FOR X=X TO 20:PRINT"[BLACK]
    "TAB(5)B$(X+1)TAB(9)K$:NEXT'ISDS
380 V=0:P=0:PRINT"[HOME,DOWN3,BLACK]
    "'DGCJ
385 Z=N-(J=3):POKE 211,Z'EMLP
390 W=PEEK(214)-2:X=PEEK(209)
    +256*PEEK(210)'IWBQ
395 IF ASC(B$(W))<>31 THEN 405'FMIQ
400 PRINT CHR$(17*-(T<>145)-145*
    (T=145));:GOTO 390'KYRJ
405 POKE 213,E:C=PEEK(211)
    :IF C=E THEN C=C-1:POKE 211,C'JYCO
410 M=X+C:POKE M,PEEK(M)OR 128
    :WAIT 198,1'GSEH
415 T=PEEK(631):POKE 198,0
    :POKE M,PEEK(M)AND 127'GVQM
420 IF T>132 AND T<138 THEN IF C=Z
    THEN X=T-133:PRINT:GOTO 495'MUTM
425 ON-(T=13)GOTO 450:IF T=145 THEN
    IF W<3 OR C>Z THEN 410'MUNR
430 IF T=17 AND((W>19 OR W=0)OR
    C>Z)OR T=148 AND W>0 THEN 410'NXZP
435 ON-(T=19 OR T=147)GOTO 410
    :IF T=34 THEN T=39'KTIQ
440 IF T=29 AND C=E OR(T=20 OR
    T=157)AND C=Z THEN 410'LTSN
445 PRINT CHR$(T);:ON 1-(T=17 OR
    T=145)GOTO 405,385'IWCQ
450 POKE 211,N:POKE 213,E:POKE 631,13
    :POKE 198,1'EYVK
455 OPEN 1,0:INPUT#1,A$:CLOSE 1
    :PRINT'ELMM
460 ON-(W=0)GOTO 525:IF B$(W)="*
    [SPACE2]"THEN 470'HQDM
465 IF LEFT$(A$,1)="*"AND W<13 THEN
    B$(W)="*":V=1:GOTO 510'JVOT
470 FOR X=1 TO LEN(A$)'EGQI
475 T$=MID$(A$,X,1):IF T$<"0"AND
    T$<>" "OR T$>"9"THEN 510'KUQV
480 NEXT:IF VAL(A$)<E(W,
    0)OR VAL(A$)>E(W,1)THEN 510'IYHQ
485 IF VAL(B$(W))<>VAL(A$)THEN
    B$(W)=A$:V=1'IVEU
490 W=W+1:ON-(W<>13 AND W<>21)GOTO 385
    :PRINT"[UP2]":GOTO 385'MUMU
495 POKE 213,79:U=-(X<>J)
    :IF U+V=0 THEN 510'JTSW
500 ON-(V=0 AND((X=2 OR X=3)AND
    G=0))GOTO 510:IF X=4 THEN 210'NXOM
505 I=J:J=X:ON V GOTO 220
    :ON X+1 GOTO 600,345,700,515'HDCO
510 PRINT"[UP]"TAB(N)"[SPACE4,LEFT4]
    "B$(W)"[UP]":GOTO 385'DLNI
515 P=0:N=14:E=78:T$=CHR$(34)+CHR$(34)
    +CHR$(20)+I$(0)'KFGS
520 PRINT"[CLEAR,DOWN2,SHFT C]
    URRENT LABEL:[CYAN]"T$F$"[HOME,
    DOWN2]";:GOTO 385'CJOK
525 OPEN 4,4,7:CMD 4:PRINT A$R$
    :IF A$>""THEN F$=A$'HTGO
```

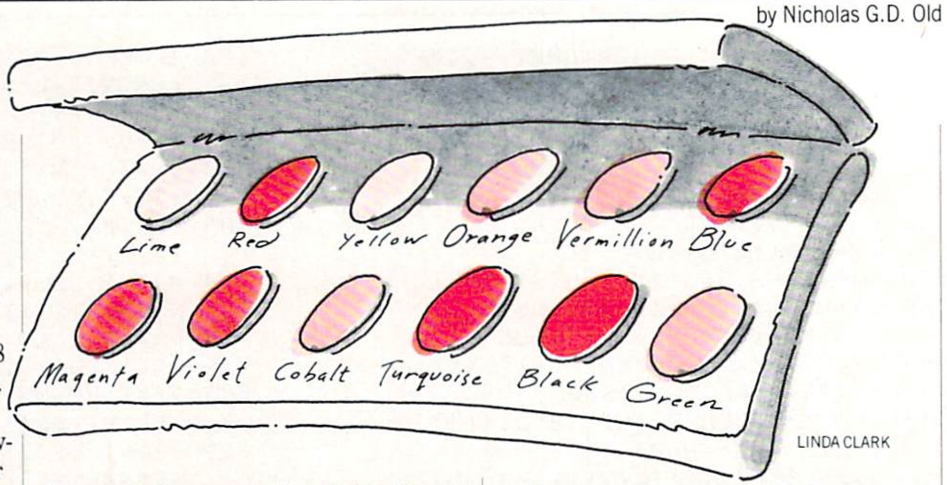
```
53Ø PRINT"[SHFT D]ATA[SHFT -,SHFT C]
    W/[SHFT C]G[SHFT -] [SHFT G]EAR
    [SPACE2,SHFT -,SPACE2,SHFT L]O-
    [SHFT M,SHFT P,SHFT H]-[SHFT H]I
    [SPACE2,SHFT -,]51[SHFT O]
    VERLAP"'BAYU
535 PRINT U$:FOR X=Ø TO A
    :V=G(Ø)*S'GNTN
54Ø Q=G(A)*F:T=G(X):Z=B(X):W=C(X)'FYSM
545 PRINT" "B$(X+1)"Ø42[SHFT -]
    "C$(X)"1Ø2[SHFT -]";'CMVO
55Ø PRINT A(X)"182[SHFT -]"B(X);
    :T=274/ABS(Q-V)'FSDM
555 IF S<F THEN PRINT"26"C(X)"323
    [SHFT -]";'EHNP
56Ø Q=INT(2ØØ+(T*(Z-V))):V=-(Q>255)
    :Q=Q-255*V'LDTS
565 PRINT"[LOCK,2]"CHR$(V)CHR$(Q);
    :FOR Y=Ø TO INT(T*(W-Z))'JRRU
57Ø PRINT CHR$(156);:NEXT:PRINT""
    :NEXT'FJAK
575 IF A<2Ø THEN FOR X=A+2 TO 21
    :PRINT" "B$(X);'IPPT
58Ø PRINT"Ø43[SHFT -,]1Ø[SHFT -,]18
    [SHFT -,]32[SHFT -]"'BAKM
585 NEXT:PRINT U$:T$="":R=1
    :GOTO 7Ø5'FNAS
59Ø V=35-(((B*2))*(D>6 OR B>2))
    :FOR V=V TO 66'KWIT
595 PRINT#4:NEXT:CLOSE 4:V=Ø:R=Ø:J=I
    :U=1:GOTO 335'IUVW
6ØØ P=Ø:N=Ø:E=3:PRINT"[CLEAR,BLACK]
    "TAB(19)"[SHFT O]VERLAP"'FMFJ
6Ø5 PRINT TAB(6)"<"TAB(21)"[SHFT M,
    SHFT P,SHFT H]"TAB(38)">[DOWN]
    "'EIUL
61Ø FOR X=1 TO 21:PRINT TAB(5)"
    [SHFT -]":NEXT:PRINT V$(23)'HPBJ
615 X=Ø:PRINT"[HOME,SPACE7]"R$TAB(7)"
    [SPACE5]"TAB(32)"[SPACE5,UP]"'EKXN
62Ø IF G=Ø THEN PRINT"[DOWN]"
    :GOTO 69Ø'FGCG
625 PRINT TAB(7)B(Ø)TAB(33)C(A)"[DOWN]
    "'DNSL
63Ø IF G=1 THEN IF S=F THEN PRINT
    :PRINT TAB(21)"*":GOTO 38Ø'KMCL
635 Y=G(Ø)*S:Q=G(A)*F:T=(Q-Y)/33
    :FOR X=Ø TO A:G$=B$:H$=B$'MKOY
64Ø A$="[RVS]"+B$:Z=(G(X)*S-Y)/T
    :C=(G(X)*F-Y)/T'KBRR
645 IF C<28 THEN H$=C$(X)+H$
    :GOTO 66Ø'GQCQ
65Ø IF Z>5 THEN G$=G$+C$(X)
    :GOTO 66Ø'GPTM
655 A$="[RVS]"+C$(X)+B$'DJRN
66Ø T$=RIGHT$(G$,Z+(Z=33))'ENLL
665 IF(C-Z<=1)THEN T$=T$+"*"
    :GOTO 68Ø'INJT
67Ø T$=T$+D$((.125+Z-INT(Z))*4)+LEFT$
    (A$,INT(C)-INT(Z))'LFDU
675 T$=T$+"9[RVOFF]"+E$((.125+C-INT(C)
    )*4)'HTBV
68Ø T$=LEFT$(T$+H$,41)'DLWM
685 PRINT"[BLACK]"B$(X+1)I$(-P)TAB(6)
    T$:P=NOT P:NEXT'HTEW
69Ø IF X<2Ø THEN FOR X=X TO 2Ø
    :PRINT"[BLACK]"B$(X+1)TAB(6)B$
    :NEXT'KTYT
695 GOTO 38Ø'BDKP
7ØØ P=Ø:PRINT"[CLEAR,DOWN]"
    :T$="[DOWN]"'DGFF
7Ø5 FOR X=2 TO D:J$(X)=MID$(STR$(F
    (X+1)-F(X)),2):NEXT'JAKR
71Ø PRINT F$(Ø);:IF B=2 THEN PRINT
    N$T$R$F$(1)N$T$:GOTO 725'GDDL
715 FOR X=2 TO B-1:PRINT J$(X);
    :IF X<B-1 THEN PRINT",";'KQHR
72Ø NEXT:PRINT T$:T=F(B)-F(2)
    :PRINT F$(1)T"[SHFT T]"T$'FWKL
725 PRINT F$(2);:IF D=6 THEN PRINT
    N$T$R$F$(3)N$T$:GOTO 74Ø'GDKR
73Ø FOR X=6 TO D-1:PRINT J$(X);
    :IF X<D-1 THEN PRINT",";'KQPO
735 NEXT:PRINT T$R$F$(3)F(D)"[SHFT T]
    "T$'CQNO
74Ø PRINT F$(4);:IF B=2 AND D=6 THEN
    PRINT N$T$:GOTO 75Ø'ITSO
745 PRINT((F(B)-F(2))+(F(D)-F(6)))"
    [SHFT T]"'EWUR
75Ø IF R THEN PRINT U$'DDYI
755 PRINT R$F$(5);:IF B=2 AND D=6
    THEN PRINT N$;:GOTO 785'IUIU
76Ø PRINT R$R$"[SPACE3]";
    :FOR X=D TO 6 STEP-1
    :PRINT"[SPACE2]"B$(X);'HRDP
765 NEXT:FOR X=2 TO B:PRINT R$R$"
    "B$(X)"[SPACE2]";'FPYS
77Ø FOR Y=D TO 6 STEP-1
    :G$=B$(X)+"/"+B$(Y):Z=Ø'JUIS
775 IF C$(Z)<>G$THEN Z=Z+1
    :GOTO 775'HOKU
78Ø PRINT RIGHT$(STR$(Z+1)+"[SPACE2]",
    4);:NEXT Y,X'GNBQ
785 ON R GOTO 59Ø:PRINT R$"[DOWN,
    SHFT P]RESS ANY KEY TO GO ON.";
    'DIAY
79Ø POKE 198,Ø:WAIT 198,1:POKE 198,Ø
    :J=I:U=1:GOTO 335'GCAT
795 DATA"","4[CMDR H,3]","[CMDR K,3]",
    "[RVS,CMDR N,RVOFF,]","[RVS]
    [RVOFF,]"'BEDU
8ØØ DATA"[RVS] [RVOFF,]","[RVS,CMDR H,
    RVOFF,]","[CMDR L,3]","[CMDR N,3]
    "," "'BEGH
8Ø5 DATA"4[RIGHT,LEFT]","[BLUE,SHFT C]
    WL[BLACK]","[BLUE,SHFT C]AD[BLACK]
    ","72 ","[BLUE,SHFT V]AR[BLACK]
    "'BESP
81Ø DATA"1Ø ","[BLUE,SHFT C]RK[BLACK]
    ","17Ø","[BLUE,SHFT W]HL[BLACK]",
    "27Ø","[SPACE3]"'BFTK
815 DATA"[SHFT C]HAINWHEEL JUMPS
    : ","[SHFT F]RONT DERAILLEUR
    CAPACITY:"'BBQV
82Ø DATA"[SHFT C]OGSET JUMPS
    : ","[SHFT R]EAR DERAILLEUR
    CAPACITY:"'BBWQ
825 DATA"[SHFT T]AKEUP REQUIREMENT
    :","[SHFT S]HIFT SEQUENCE:"'BBQU
```

END

by Nicholas G.D. Old

Color Setup

for the Commodore 64 and 128



LINDA CLARK

Whether you like yellow letters on a black screen or black letters on a white screen, the Commodore 64 and 128 computers can adapt to almost any taste. Trying to find the best combination by typing POKE or COLOR commands, however, can take a long time: there are over 200 possibilities (over 4,000 if you include border colors).

For a faster and easier way to find that perfect color combination, load and run Color Setup 64 on the 64 or Color Setup 128 on the 128. Use the keys listed on the screen to change the border, screen and text colors, and to change between 40- and 80-column displays (128 version only). As you try different possibilities, the screen shows you the commands which will reproduce the current display colors. The 64 version displays POKE commands and CTRL or COMMODORE key presses, while the 128 version displays COLOR commands. When you find a color combination you like, write down the commands shown on the screen. These commands will allow you to produce the same colors whenever you want.

Computer users can run Color Setup to help decide which commands give them a comfortable screen display, or to set up their favorite screen colors without having to look up POKE or COLOR values. Programmers can also use it to quickly find effective color combinations for their own programs—eye-catching colors for error messages and easy-to-read colors for text and help screens. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

Color Setup 64

```
100 BC=0:SC=0:TC=7:REM INITIAL BORDER,
     SCREEN, AND TEXT COLOR CODES'EADL
110 DEF FN UP(X)=(X+1)AND 15'FLLB
120 POKE 650,128:REM ALL KEYS AUTO
    REPEAT'CAIE
130 PRINT CHR$(147)'CFBA
140 POKE 53280,BC:POKE 53281,SC
    :POKE 646,TC:REM SET COLORS'EJEJ
150 PRINT CHR$(19) SPC(12) "COLOR
    SETUP/64"'DHJH
160 PRINT:PRINT SPC(18) "BY"'DEOE
170 PRINT:PRINT SPC(15) "NICK
    OLD"'DEDG
180 PRINT:PRINT'CBHE
190 PRINT " VALUES LISTED BELOW WILL
    PRODUCE THIS"'BAJP
200 PRINT " COLOR COMBINATION:"'BANB
210 PRINT'BACW
220 PRINT "[SPACE3]BORDER COLOR",
    "POKE 53280,"+STR$(BC)+" "'EFII
230 PRINT "[SPACE3]SCREEN COLOR",
    "POKE 53281,"+STR$(SC)+" "'EFDJ
240 PRINT "[SPACE3]TEXT COLOR",'BBSE
250 IF TC<=7 THEN PRINT
    "CONTROL"+STR$(TC+1)+"[SPACE2]
    "'JIOL
260 IF TC>7 THEN PRINT
    "COMMODORE"+STR$(TC-7)'HIWL
270 PRINT:PRINT:PRINT:PRINT " COMMANDS
    :"'EDXI
280 PRINT "[SPACE2]<1> CHANGES BORDER
    COLOR"'BAVL
290 PRINT "[SPACE2]<2> CHANGES SCREEN
    COLOR"'BAYM
300 PRINT "[SPACE2]<3> CHANGES TEXT
    COLOR"'BAGD
310 PRINT:PRINT "[SPACE2]
    <Q> QUITS THIS PROGRAM"'CBHF
320 GET K$:IF K$="" THEN 320'EIYD
330 IF K$="1" THEN BC=FN UP(BC)'FKTF
340 IF K$="2" THEN SC=FN UP(SC)'FKEG
350 IF K$="3" THEN TC=FN UP(TC)'FKCI
360 IF SC=TC THEN 340:REM SKIP
    IDENTICAL SCREEN AND TEXT COLOR
    COMBINATIONS'EBSU
370 IF K$="Q"THEN POKE 650,0:END
    :REM CANCEL KEYBOARD AUTO REPEAT
    BEFORE EXIT'GSWT
380 GOTO 140:REM UPDATE DISPLAY WITH
    NEW COLORS AND CORRESPONDING
    COMMANDS'CEKV
```

END

Color Setup 128

```
100 BC=1:SC=1:TC=8:REM INITIAL BORDER,
     SCREEN, AND TEXT COLOR CODES'EAGL
110 H$=CHR$(19):CL$=CHR$(27)+"Q"
    :REM CURSOR HOME, CLEAR TO END OF
    LINE'GRKL
120 DEF FN UP(X)=(X AND 15)+1
    :REM COUNT UP FROM 1 TO 16,
     THEN REPEAT'GOKL
130 IF RGR(0)=5 THEN GM=5:ELSE GM=0
    :REM 40 OR 80 COLUMN TEXT
    ONLY'IHPL
140 DO'BAJY
150 GRAPHIC GM'BCNB
```

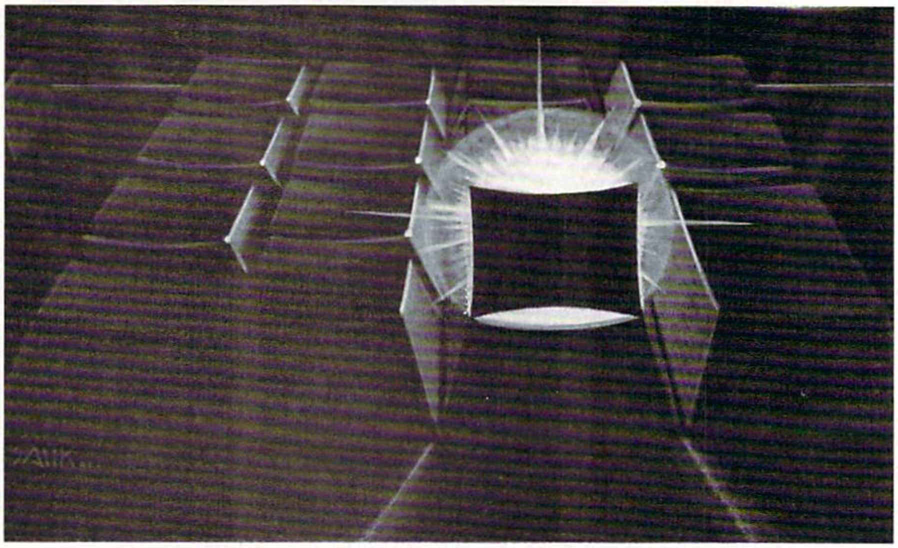
```
160 PRINT H$ H$:SCNCLR:REM CANCEL ANY
    WINDOWS AND CLEAR SCREEN'DLPN
170 IF GM THEN WINDOW 2Ø,Ø,79,24,1
    :FAST:ELSE SLOW:REM WINDOW
    CENTERS TEXT ON 8Ø COLUMN
    SCREEN'HDRV
180 DO'BAJD
190 IF GM THEN COLOR 6,SC
    :ELSE COLOR Ø,SC:COLOR 4,BC
    :REM SET SCREEN AND BORDER COLORS
    FOR CURRENT MODE'HFDY
200 COLOR 5,TC:REM TEXT COLOR'COHB
210 PRINT H$ SPC(11) "COLOR
    SETUP/128"'CFLD
220 PRINT:PRINT SPC(17)"BY"'DENB
230 PRINT:PRINT SPC(14)"NICK OLD"'DECD
240 PRINT:PRINT:PRINT " VALUES LISTED
    BELOW WILL PRODUCE THIS"'DCYM
250 PRINT " COLOR COMBINATION:"'BANG
260 PRINT:IF GM=Ø THEN PRINT "[SPACE3]
    BORDER COLOR","COLOR 4,"CL$ BC
    :REM 4Ø COLUMNS ONLY'GYNR
270 PRINT "[SPACE3]SCREEN COLOR",
    "COLOR "CL$;:IF GM THEN PRINT "6,
    "SC:ELSE PRINT "Ø,"SC
    :REM PRINT CORRECT COMMANDS FOR
    CURRENT DISPLAY MODE'HFDE
280 PRINT "[SPACE3]TEXT COLOR",
    "COLOR 5,"CL$ TC'BGXL
290 PRINT:PRINT:PRINT " COMMANDS
    :"'DCSJ
300 IF GM=Ø THEN PRINT "[SPACE2]
    <1> CHANGES BORDER COLOR"
    :REM 4Ø COLUMNS ONLY'FRCL
310 PRINT "[SPACE2]<2> CHANGES SCREEN
    COLOR"'BAYF
320 PRINT "[SPACE2]<3> CHANGES TEXT
    COLOR"'BAGF
330 PRINT "[SPACE2]<4> SWITCHES TO ";
    :IF GM THEN PRINT "4Ø COLUMNS"
    :ELSE PRINT "8Ø COLUMNS"'GFUO
340 PRINT:PRINT "[SPACE2]
    <Q> QUITS THIS PROGRAM"'CBHI
350 GET KEY A$'CCED
360 IF A$="1" THEN IF GM=Ø THEN BC=FN
    UP(BC):REM CHANGE BORDER COLOR IN
    4Ø COLUMN MODE ONLY'JYKW
370 DO'BAJE
380 IF A$="2" THEN SC=FN UP(SC)'FKTK
390 IF A$="3" THEN TC=FN UP(TC)'FKWL
400 LOOP WHILE SC=TC:REM SKIP
    IDENTICAL SCREEN AND TEXT COLOR
    COMBINATIONS'EXYP
410 IF A$="4" THEN BEGIN:PRINT H$ H$
    :SCNCLR:IF GM THEN GM=Ø:ELSE GM=5
    :BEND:REM CNCEL WINDOW AND CLEAR
    SCREEN BEFORE CHANGING DISPLAY
    MODE'NWWC
420 LOOP UNTIL A$="4" OR A$="Q"'FEBF
430 LOOP UNTIL A$="Q"'DCFE
440 IF GM THEN PRINT H$ H$:CHAR,Ø,2Ø
    :REM CANCEL WINDOW AND PUT CURSOR
    BELOW TEXT IF RETURNING TO BASIC
    IN 8Ø COLUMN MODE'FDUC
450 END'BACD
```

END

by Sgt. Robert Gaumond

Function Keys128

for the Commodore 128



ED SAUK

This handy program (for the 128) allows you to reprogram your function keys; it also saves the file it creates to disk, so you can recall it at will. Just about anything the computer can do, can be programmed in the function keys. The only limitation is that your definitions must *not* exceed 255 characters, since that's all the function keys can hold.

The only character that cannot be programmed directly is the DELETE character, as I used this one for corrections when programming the keys. So if you must insert a DELETE command, you should use CHR$(20) instead of just pressing DELETE. Also, since you can use RETURN to tell the computer that you are finished with a particular key, you must use the back arrow (top left key on keyboard) to send a RETURN (CHR$(13)) command.

Otherwise the program runs by itself. When it starts it will ask which key you wish to reprogram, answer by pressing the corresponding number or function key, then reprogram the key. Here are a few examples you could try:

1 ?"[CLRHOME][TAB][TAB] BOOTING FUNCTION KEYS128 [CTRL1]"[BACK ARROW]RUN"FUN*" [BACK ARROW]

4 COLLECT[BACK ARROW] CATALOG[BACK ARROW]

(Note that you can use authorized abbreviations too, such as DI[SHIFT]R, etc.)

Of course you could also use the keys for a variety of purposes such as repetitive commands when programming—such as DATA, PRINT#, CHR$(—or frequently-used words in a database, or calling up a sprite and moving it, or drawing something, or . . .

The program will work both in 40- and 80-column mode. The first time you run the program an error message will be displayed on the screen for a few seconds—this is expected, since it will attempt to load your file (but you haven't programmed one yet), and is not a problem.

The program can easily be renumbered and inserted in your own programs as a subroutine, the only thing you'll have to change is the last line, which gives the control back to your program. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

Function Keys128

```
2 IF RGR(Ø)=5 THEN FAST
  :SPC$="[RIGHT25]"'GKIJ
4 N=49:FOR Q=1 TO 8:KEY Q,CHR$(N)
  :N=N+1:NEXT:W=Ø:T=Ø'LYEP
6 PRINT"[CLEAR]"CHR$(14)CHR$(11)
  :COLOR Ø,1:COLOR 4,1Ø:N$(I)=""
  :OF$=CHR$(143)'IHBR
8 DE$=CHR$(2Ø):CR$=CHR$(13)
  :FL$=CHR$(15):ESC$=CHR$(27)'IHIS
1Ø DN$="[HOME,DOWN19,RIGHT7]"+SPC$
  :POKE 8Ø8,1ØØ:REM DISABLE
  RUN/STOP'EGUJ
14 GOSUB 26:REM GO READ THE FILE'CQMG
16 GOSUB 52:REM MODIFY THE FUNCTION
   KEYS'CYIL
18 GOSUB 98:REM REPROGRAM FUNCTION
   KEYS'CYYN
2Ø GOSUB 4Ø:REM REWRITE THE FILE'CRUD
22 GOTO 15Ø:REM EXIT THIS PROGRAM'CTNG
26 REM READ FILE'BICG
28 DOPEN#2,"KEY DEF":FOR I=1 TO 8'EITM
3Ø INPUT#2,KY$:N$(I)=KY$'COFD
32 GOSUB 142:REM CHECK ERROR
   CHANNEL'CVFH
34 NEXT:DCLOSE#2'CEEF
36 PRINT"[CLEAR]":RETURN'CBTG
4Ø REM WRITE FILE'BJHD
42 DOPEN#2,"@KEY DEF",W
   :FOR F=1 TO 8'EKMI
44 KY$=N$(F):IF KY$=""THEN KY$="
   "'FPDL
46 PRINT#2,KY$:GOSUB 142'CJCJ
48 NEXT:DCLOSE#2:RETURN'DFEK
52 REM WHICH FUNCTION KEY'BQFI
54 PRINT"[HOME,DOWN]"SPC$"[GREEN,
   SPACE4,SHFT W]HICH [YELLOW,SHFT F]
    [GREEN,SHFT K,SHFT E,SHFT Y] TO
   [SHFT R]EPROGRAM"FL$" [YELLOW]?
   [DOWN]"'BHLT
56 PRINT SPC$"[GRAY3] ([RVS,CYAN,
   SHFT R,SHFT E,SHFT T,SHFT U,SHFT R,
   SHFT N,RVOFF,GRAY3] EXITS WITHOUT
   CHANGES) [GREEN,DOWN]"'BETW
58 FOR I=1 TO 8:PRINT SPC$"[RIGHT2,
   GREEN,SHFT F]"(I)"[GRAY3]= [GREEN]
   "N$(I):NEXT'FRER
6Ø GET KEY K$:F=VAL(K$)
   :IF K$=CR$THEN 64'HQLK
62 IF F<1 OR F>8 THEN 6Ø:T=1'GJSK
64 IF K$=CR$AND T=Ø THEN 13Ø'FKHL
66 IF K$=CR$THEN PRINT"[HOME,DOWN4]
```

```
   "CHR$(27)CHR$(64):FOR I=1 TO 8
   :PRINT SPC$"[RIGHT2,GREEN,SHFT F]
   "(I)"[GRAY3]= [GREEN]"N$(I):NEXT
   :GOTO 116'MKVA
7Ø REM GET DATA FOR FUNCTION KEY'BVPJ
72 PRINT"[HOME,DOWN]"SPC$"[SPACE5,
   SHFT P]RESS "FL$"[YELLOW,
   BACK ARROW,GREEN]"OF$" FOR <
   [SHFT R,SHFT E,SHFT T,SHFT U,
   SHFT R,SHFT N]>[SPACE6,DOWN]"'BKET
74 PRINT SPC$"[GRAY3] ([RVS,CYAN,
   SHFT R,SHFT E,SHFT T,SHFT U,SHFT R,
   SHFT N,GRAY3,RVOFF] ERASES DATA ON
   [YELLOW,SHFT F] "K$" [GRAY3,SHFT K]
   EY)[SPACE2,DOWN]"'BGLY
76 PRINT DN$"[UP]":PRINT SPC$"[RIGHT2,
   YELLOW,SHFT F]"F"[GRAY3]= [YELLOW]
   ";:N$(I)=""'DQLS
78 GET KEY K$:N$(F)=N$(I)
   :IF K$=CHR$(34)THEN W=W+1
   :IF W=2 THEN W=Ø'NDXB
8Ø IF K$=CHR$(27)THEN K$=CHR$(191)
   'GNRK
82 IF K$=CR$THEN W=Ø:GOTO 66'FKPL
84 IF K$=DE$AND LEN(N$(I))<1 THEN W=Ø
   :PRINT DN$N$(I)" ":GOTO 78'JCKT
86 IF K$=DE$THEN N$(I)=LEFT$(N$(I),
   LEN(N$(I))-1):PRINT DN$N$(I)+" "
   :GOTO 78'KNFY
88 REM CHECK FOR QUOTE MODE'BRJR
9Ø IF K$="[CLEAR]"OR K$="[DOWN]
   "OR K$="[RIGHT]"OR K$="[UP]
   "OR K$=CHR$(148)OR K$="[HOME]
   "OR K$="[LEFT]"OR K$=CHR$(1Ø)THEN
   92:ELSE 94'UFKC
92 IF W=Ø THEN K$="":PRINT DN$"[RED,
   DOWN,SHFT E]NTER [SHFT Q,SHFT U,
   SHFT O,SHFT T,SHFT E] MODE FIRST!
   [YELLOW]":SLEEP 1:PRINT DN$"[DOWN,
   SPACE23]"'HPCD
94 N$(I)=N$(I)+K$:PRINT DN$N$(I)
   :GOTO 78'EYTQ
98 REM REPROGRAM KEY'BMNR
1ØØ FOR I=1 TO 8:C=LEN(N$(I))
    :X$(I)=N$(I)'GXED
1Ø2 FOR V=1 TO C'DDKY
1Ø4 IF MID$(X$(I),V,1)="[BACK ARROW]
    "THEN X$(I)=LEFT$(X$(I),
    V-1)+CR$+RIGHT$(X$(I),C-V)'LOKP
1Ø6 IF MID$(X$(I),V,1)=CHR$(191)THEN
    X$(I)=LEFT$(X$(I),V-1)
    +ESC$+RIGHT$(X$(I),C-V)'MUNS
1Ø8 NEXT V'BBPD
11Ø KEY I,X$(I):NEXT I:RETURN'DKFA
114 REM CHOOSE NEW KEY OR LEAVE
    PROGRAM'BBWI
116 PRINT"[HOME,DOWN]"SPC$"[SPACE3,
    YELLOW]1[GREEN]-[YELLOW]8[GREEN]
     CHANGE, [YELLOW,SHFT S,GREEN]
    AVE OR [YELLOW,SHFT E,GREEN]
    XIT"FL$"[YELLOW] ?[GREEN] [DOWN]
    "'BHLQ
118 PRINT SPC$"[GRAY3] ([SHFT P]
    RESSING [CYAN,RVS,SHFT R,SHFT E,
    SHFT T,SHFT U,SHFT R,SHFT N,RVOFF,
    GRAY3] ALSO [YELLOW,SHFT E,GRAY3]
    XITS)[SPACE9,DOWN]"'BEYW
12Ø GET KEY K$:F=VAL(K$)'EIQB
122 IF K$<CHR$(49)OR K$>CHR$(57)THEN
    126'HPWG
124 GOTO 64'BCRB
126 IF K$<>"S"AND K$<>"E"AND
    K$<>CR$THEN 12Ø'KMNM
128 T=1:N$(F)=N$(I)'CNFJ
13Ø PRINT"[HOME,DOWN]"SPC$"[GRAY3]
    [SHFT R]EPROGRAMMING YOUR KEYS
    [SPACE9,DOWN]"'BEMI
132 PRINT SPC$"[SPACE3,SHFT P]
    LEASE STANDBYE"FL$"...[SPACE14,
    DOWN]"'BHQJ
134 FOR I=1 TO 8:PRINT SPC$"[RIGHT2,
    GREEN,SHFT F]"(I)"[GRAY3]=
    [YELLOW]"N$(I):NEXT'FRCL
136 IF K$="S"THEN RETURN'ECCH
138 GOSUB 98:GOTO 15Ø:REM IF
    <E>OR<RETURN> EXIT WITHOUT SAVING
    TO DISK'DUIU
142 REM ERROR CHECK'BKSE
144 IF DS>Ø THEN PRINT DN$"[DOWN,
    L. RED]"DS$:SLEEP 1'FMHJ
146 RETURN'BAQF
15Ø REM ENABLE RUN/STOP KEY,
     THEN END'BALH
152 POKE 8Ø8,11Ø'BHTD
154 PRINT SPC$"[CLEAR,GRAY3,DOWN]154
    [SHFT T]HE PROGRAM EXITS HERE."
    :END'CFNP
```

END

by Buck Childress

Easy DOS It

for the Commodore 64


LINDA CLARK

Did Doctor Frankenstein have a party with my fingers, or do they always feel like tenderloin steak?! After my latest bout of housekeeping chores on about a dozen disks, I was asking myself that very question.

Thirty keystrokes (not counting the command) . . . that's what it takes whenever you want to perform a disk drive operation such as scratch, validate, initialize, etc.

OPEN15,8,15:PRINT#15,"...
:CLOSE15

Then an additional 65 strokes if that infamous error light begins its rhythmic flashing:

OPEN15,8,15:INPUT#15,EN$,EM$,
ET$,ES$:PRINTEN$;EM$;ET$;
ES$:CLOSE15

That can be as many as 95 pumps on the keys for one single task! Let's not forget the directory. You'll want to bring it up every now and then to keep track of what's going on. All you need now are some electrodes, and Dr. Frankenstein will feel right at home!

The 1541 and 1571 Disk Operating Systems (DOS for short) are extremely efficient, but you can wear your fingers to a frazzle in a hurry if you do much housekeeping. Wouldn't it be nice to condense those 95 strokes into one? Now you can with Easy DOS It. Easy DOS It makes disk upkeep a breeze. It works on the 64 and the 128 in 64 mode. And it works on both the 1541 and 1571 drives. Here's how to use it:

After saving a copy of Easy DOS It, run it. The loader pokes the machine language data into memory and checks for errors. Now type SYS 53000 and press RETURN. You switch it off the same way. The first SYS toggles it on, the second toggles it off, etc.

Let's say you want to scratch a file called "PROGRAM". Just type a quotation mark followed by the disk command:

"S0:PROGRAM

Easy DOS It automatically opens channel 15, scratches the file, closes the channel, and returns the drive status (which squishes the error light). You can use wild cards, too:

"S0:PROG*

scratches all files beginning with PROG. Validating and initializing are just as easy:

"V

"I

You can rename files, copy files . . . even format disks. In fact, Easy DOS It performs everything the old method will, only faster and easier.

Easy DOS It also has a directory option. Just press the $ key then RETURN. Up pops the directory. It's handy when you're really taking the scalpel to a disk.

Use Easy DOS It and save your fingers for more important things, like counting the stars in the milky way. ■

Before typing this program, read "How to Enter Programs" and "How to Use the Magazine Entry Program." The BASIC programs in this magazine are available on disk from Loadstar, P.O. Box 30008, Shreveport, LA 71130-0007, 1-800-831-2694.

Easy DOS It

```
20 PRINT CHR$(147)"LOADING AND
   CHECKING DATA LINE:":J=53000'DMIK
30 FOR B=0 TO 11:READ A'EGWC
40 IF B=0 THEN L=PEEK(64)*256+PEEK(63)
   :PRINT CHR$(19)TAB(31)L:PRINT'MYCM
50 IF A<0 OR A>255 THEN 70'FIAF
60 POKE J+B,A:X=X+A:D=D+1:NEXT B
   :READ A:IF A=X THEN 80'LVVO
70 PRINT"ERROR IN DATA LINE:"L
   :END'CCVJ
80 X=0:J=J+12:IF D<228 THEN 30'GOPL
90 PRINT"THE DATA IS OK...":PRINT'CBXK
100 PRINT"SYS 53000 TOGGLES ON AND
    OFF...":END'CBMD
110 DATA 169,79,32,210,255,169,78,162,
    42,160,207,204,1767'BXXF
120 DATA 1,3,208,9,169,70,32,210,255,
    162,139,160,1418'BTAG
130 DATA 227,142,0,3,140,1,3,76,210,
    255,173,0,1230'BQCG
140 DATA 2,201,34,240,7,201,36,240,80,
    76,139,227,1483'BTAH
150 DATA 173,1,2,201,85,208,10,169,59,
    141,2,2,1053'BQRI
160 DATA 169,0,141,3,2,169,15,162,8,
    168,32,186,1055'BRMJ
170 DATA 255,169,0,32,189,255,32,192,
    255,162,15,32,1588'BVUL
180 DATA 201,255,162,1,189,0,2,240,6,
    32,210,255,1553'BSOL
190 DATA 232,208,245,169,13,32,210,
    255,32,204,255,162,2017'BYPN
200 DATA 15,32,198,255,32,207,255,201,
    13,240,91,32,1571'BVUF
210 DATA 210,255,76,120,207,32,68,229,
    169,5,162,8,1541'BUJG
220 DATA 160,0,32,186,255,169,1,162,
    234,160,207,32,1598'BVEH
230 DATA 189,255,32,192,255,162,5,32,
    198,255,32,207,1814'BWUI
240 DATA 255,32,207,255,32,207,255,32,
    207,255,32,207,1976'BXJJ
250 DATA 255,72,32,207,255,168,104,
    170,165,144,208,27,1807'BYGL
260 DATA 152,32,205,189,169,32,32,210,
    255,32,225,255,1788'BXLL
270 DATA 240,13,32,207,255,208,243,
    169,13,32,210,255,1877'BXAM
280 DATA 76,168,207,169,5,44,169,21,
    32,195,255,32,1373'BUYN
290 DATA 204,255,169,0,141,0,2,76,116,
    164,36,0,1163'BRTN
```

END

by Mark Jordan

Socrates

Explore the 128 in its powerful native mode. Some of the articles in this series may be technical, some not so technical—but we guarantee that they will spark your creativity.


BOB CLARK

Socrates, it is said, taught by asking questions. Thus we have the phrase "Socratic method," meaning a method of arriving at truth through the use of repeated questions. This month's program is just that—a Socratic device. But instead of our usual concept of the user typing in a question for the computer to answer, this program simply asks the questions and expects the user to respond.

At this point you may well ask (ah, a question), where does the computer get the questions? Well, in the case of the listing in this issue, it gets them from you when you type them in and save the program. And you get them from me because I put them in the data statements. And I got them from an out-of-print English textbook I used to teach from called *Patterns of Literature* published by Singer/Random House.

You may next ask, what are these questions about? In this case, they are about literature. Each question was chosen to help the user learn to understand literature (mainly novels) better. The questions are arranged in such a way to lead the user along the paths of interpreting literature, from the initial and unprocessed reaction of a book to a finished, refined understanding.

And finally, you may ask, why even use a computer? Why not just get a list of good Socratic questions on any topic and answer them on paper? The answer to that is as simple as it is to this one: why use a word processor when a pen and paper will do? "Socrates" lets the user type and edit his answers, save them to disk, load them later, and print them out neatly formatted with the questions alongside.

The process *works* too, by the way, and that's good to know. You see, if you believe in the Socratic method, all you must do to teach others is to know enough to ask the right questions in the right order. I'm aware that there are many ways one may come to knowledge of truth, but the Socratic method is surely one of the best.

So if you type in this month's listing, you will not only have a program that can help you to learn to interpret literature Socratically, more importantly you will have a program that you can use to teach (and learn) *anything* Socratically. And changing it for different topics is as easy as typing in new data statements.

Two Ways to Get the Program

Type it in and save it. Use the Magazine Entry Program at the back of this magazine to catch your errors. Or, if you don't like typing in magazine programs, buy the LOADSTAR disk that will soon be out with this program on it.

Running the Program

To use "Socrates" you simply must type RUN and follow the prompts. There are three screen windows which do different things, but nothing is very tricky. The top window gives prompts: it either prompts you with your options (save, load, input, edit, or print—this is the main menu) or prompts you with the questions themselves.

The second window is where you do your typing. It has only one editing key, the DELete key. I would gladly have included many more options, but the program is as long as I dare put into a magazine. You have two lines to type into with a maximum of 126 characters per answer.

The bottom window, the biggest, is your list of responses to the questions which grows as you type them. Once they outgrow the screen you'll need to use the cursor keys to scroll around to look at them. Of course, if you do questions systematically, you'll have no need to scroll your answers because you'll simply be answering questions as they come. But how many of us are systematic? Therefore, if you decide to go back to re-edit one of your answers, simply scroll it so that the answer you want to edit is the top one in your window and press "E" (for edit).

But before you learn about the editing option, you need to learn how to input. Easy, press RETURN from the original menu, and the questions will begin appearing in the prompt window. You simply start typing your answers. When you're exhausted (or finished with the questions), press ESCape to exit that mode.

If you do get exhausted and don't feel like answering all the questions in one session, press "S" from the main menu (the main menu reappears after escaping the input mode) and follow the prompts. Please note: all files are saved with a check mark/period as the first two characters. This helps when you need to use the directory to load a previously saved file: only Socrates files show up on the screen.

Loading is as simple as saving. The directory will automatically appear, so you

can see the files exactly as you have saved them. Please note again: don't type the check mark/period prefix.

The final option, printing, is achieved from the main menu by pressing "P." You'll be reminded to turn on your printer and adjust your paper. Then press RETURN and it will print the questions followed by the answers.

So What's the Big Deal?

The big deal is that having gone through this question-answering process, you will undoubtedly find you have more insight into your subject. The interesting thing is that this even applies if you are the one who created the question list. And once the answers are printed out, you can use the printout to help you write about your topic. In the case of the literary questions included here, you might now be able to write the best book review of your life.

That's the big deal. The really big deal is you can create a special version for another topic, maybe for yourself as a kind of mental checklist, maybe for your kids' schoolwork. Obviously, the type of learning that this program engenders is not simple rote memory. Also, I doubt if you could use this program to lead a young person to greater comprehension of geometry. But for topics where one must interpret, analyze, compare, and evaluate—topics such as literature, the Bible, history and psychology—Socrates really works.

And as promised, it's easy to tailor Socrates to any topic. All you need to do is delete all my data statements and type in new ones. To delete mine load the program and type DELETE 775-920. Now look carefully at the data statements in the listing, and you'll see that I actually didn't tell you to delete all of them. I left lines 770 and 925. Line 770 is a prompt that you must have, so don't mess with it. Line 925 tells the program that the data statements are complete. You can change its line number if you like, but be sure it is the last data statement in your program.

When you type in your data statement be sure to enclose it with quotes. Put your computer into lower-case mode (press the COMMODORE key and SHIFT together) and type your data statements using upper- and lower-case. The prompt window allows two lines per question. You can break long questions into two data items. If you have a question that's only one line long, be sure to place an extra comma after it to tell the computer that your second line is just an empty line.

You may be wondering where you are going to come up with good Socratic questions on any given topic. The hottest thing in education is to lead students to higher levels of learning by using Bloom's Taxonomy of the Cognitive Domain. It is simply a breakdown of learning into six ascending categories. Take a look:

1. Knowledge. This level is simply rote memorization of data.
2. Comprehension. When the facts make sense, you're here.
3. Application. Apply your comprehension to a problem.
4. Analysis. Break down the subject into components.
5. Synthesis. Reassemble the components by creating something new.
6. Evaluation. Make a judgment based on your greater awareness of the subject.

You can use this taxonomy to help design questions on a topic by starting with simple knowledge questions, advancing to questions which check for comprehension, and so on. Let me illustrate how a Bible teacher might do so for a study of the creation story in Genesis.

The first questions will check to see if the user knows the facts such as, "What was the tree that man was told not to eat of?" Next, to check for comprehension you might ask; "In what way was Adam responsible for more than just himself?" To apply that knowledge ask, "What 'tree' might Adam be told not to 'eat' of today?" Then you can induce analysis by asking, "What were the three steps involved in Eve's yielding to temptation?" A question such as, "Describe the sudden changes that would have occurred in the beasts of the Garden of Eden at the moment after 'the fall.'" would require some creative synthesis by the user. Finally, ask the user to evaluate with a question like this: "Do you feel man's fall was inevitable?"

Of course, these questions are specific to just that story. A better set of questions for the Bible teacher would be generic ones that fit any Bible story. That way the teacher could prep himself for any and every lesson. ■

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Socrates

```
10 IF RWINDOW(2)=40 THEN PRINT"
   [SHFT P]LEASE SWITCH TO 80-COLUMN
   MODE.":END'GHUK
15 FAST:TRAP 750'CFHE
20 GOSUB 75:GOSUB 120:GOSUB 170
   :GOSUB 220'EOND
30 DO'BAJY
35 PR=1'BDHF
40 GET KEY A1$:AA=INSTR("ESLP[UP,DOWN]
   "+CR$,A1$):IF AA=0 THEN 40'IVVL
45 ON AA GOSUB 260,450,535,610,365,
   390,260'CEWL
55 LOOP'BAKG
60 END'BACC
70 REM VARIABLES'BJOG
75 DIM PR$(100,1),A$(999),B$(999)'BBPN
80 E$=CHR$(27):CR$=CHR$(13)
   :DE$=CHR$(20):EV$=E$+"V":EW$=E$+"W"
   :Q$=CHR$(34)'MQTV
85 FOR T=1 TO 76:PU$=PU$+"#"
   :SP$=SP$+" ":NEXT:TB$="[SPACE8]"
   :PU$=PU$+"="'LFHA
90 FOR T=32 TO 90:KE$=KE$+CHR$(T)
   :K$=K$+CHR$(T+128):NEXT'LCRS
95 KE$=KE$+K$+DE$+CR$+E$+"[UP,DOWN]"
   :K$="":T=0'IWYV
100 DO UNTIL PR$(T,0)="END"
    :READ PR$(T,0),PR$(T,1):T=T+1
    :LOOP'HGYI
105 RETURN'BAQA
115 REM PERMANENT DISPLAY'BQDG
120 PRINT CHR$(14)E$"M"E$"R[L. GREEN,
    GRAY3,HOME2,CLEAR,BLACK]"
    :WINDOW 2,14,77,23,1'DWQG
125 PRINT"[HOME2,GRAY3]",,"[SPACE6,
    SHFT L] I T E R A R Y[SPACE4,
    SHFT A] G E N T"'BCIL
130 PRINT,,,"[RIGHT,SPACE2]BY [SHFT M]
    ARK [SHFT J]ORDAN[SPACE2,GRAY3]
    "'BDMF
135 CHAR,31,3,"[L. BLUE,SPACE3,SHFT P]
    ROMPT [SHFT W]INDOW[SPACE2]"'BGCL
140 CHAR,31,8,"[PURPLE,SPACE3,SHFT I]
```

```
    NPUT [SHFT W]INDOW[SPACE3]"'BGOG
145 CHAR,31,13,"[GRAY3,SPACE3,SHFT U]
    SER [SHFT C]OMMENTS[SPACE2]",
    1'BJYM
150 CHAR,20,24,"[GRAY3,SHFT U]
    SE CURSOR UP/DOWN TO SCROLL YOUR
    COMMENTS."'BHNP
155 RETURN'BAQF
165 REM PROMPT WINDOW'BMWK
170 WC=1'BDYD
175 PRINT"[L. BLUE]":WINDOW 2,4,77,7,1
    :PRINT'DNSM
180 IF A1$="P"THEN RETURN'EDNG
185 PR=CC+1:IF WC=1 THEN PR=0'GMIP
190 WC=0:IF A1$="E"THEN PR=TS+1'GMAL
195 PRINT USING PU$;PR$(PR,0)'CNWN
200 PRINT"[HOME,DOWN]":PRINT USING
    PU$;PR$(PR,1)'DOOB
205 RETURN'BAQB
215 REM ANSWER WINDOW'BMEG
220 WC=1'BDYY
225 PRINT"[PURPLE]":WINDOW 2,9,77,12,
    WC:IF WC=1 THEN 245'FVUL
230 WC=0'BDXA
235 CHAR,20,0,"[SHFT P]RESS [SHFT R,
    SHFT E,SHFT T,SHFT U,SHFT R,
    SHFT N] TO ENTER, [SHFT E,SHFT S,
    SHFT C]APE TO EXIT."'BGAV
240 PRINT"[BLACK]":WINDOW 8,10,71,11,1
    :PRINT"[GRAY3]";'DQFG
245 RETURN'BAQF
255 REM BEGIN INPUTTING'BOGK
260 WC=0:GOSUB 175'CHXE
265 GOSUB 225'BDMI
270 PRINT"[RVS]";:IP$="":CX=CC'DKFH
275 IF A1$="E"THEN IP$=B$(TS)
    :PRINT IP$;:LE=LEN(IP$):CX=TS'IFLU
280 POKE 248,PEEK(248)OR 64'DLSI
285 DO:SYS 52591'CGAL
290 GET KEY A$:P=INSTR(KE$,A$)
    :IF P=0 THEN 290'HSVN
295 IF P>119 THEN EXIT'EELN
300 IF A$=DE$THEN BEGIN
    :IF LE=0 THEN 290'HNIE
305 IP$=LEFT$(IP$,LE-1)
    :A$=" [LEFT2] [LEFT]"
    :GOTO 320'FTKL
310 BEND'BBXY
315 IP$=IP$+A$'CIIG
320 PRINT A$;:LE=LEN(IP$)
    :IF LE=127 THEN EXIT'HRNH
325 LOOP'BAKE
330 SYS 52639'BFQB
335 IF P<121 AND IP$<>"" THEN
    B$(CX)=IP$:A$(CX)=LEFT$(IP$,75)
    :IF A1$=CR$THEN GOSUB 415:CC=CC+1
    :GOTO 260'QBXB
340 IF A1$="E"THEN CHAR,0,0,A$(CX),1
    :A1$=""'FUEI
345 GOSUB 170:GOSUB 220'CHCI
350 RETURN'BAQC
360 REM SCROLL USER COMMENTS'BSDJ
365 PRINT:WINDOW 2,14,77,23'CMQL
370 TS=TS-1:IF TS<0 THEN TS=0
    :GOTO 380'HQJM
375 CHAR,0,0,"[BLACK]"+EW$+"[GRAY3]
    "+A$(TS),1'EQEQ
380 RETURN'BAQF
390 PRINT:WINDOW 2,14,77,23'CMQJ
395 TD=TS:TS=TS+1:IF TS=CC THEN TS=TD
    :GOTO 405'IXHW
400 CHAR,0,9,"[BLACK]"+EV$+"[GRAY3]
    "+A$(TS+9),1'FRIG
405 RETURN'BAQD
415 WINDOW 2,14,77,23'BLGH
420 IF CC>TS+10 THEN PRINT"[BLACK,
    CLEAR,GRAY3]":TS=CC-9:FOR T=0 TO 9
    :CHAR,0,T,A$(TS+T),1:NEXT
    :GOTO 435'OLCT
425 B$="":IF CC=TS+10 THEN B$="[BLACK]
    "+EV$+"[GRAY3]":TS=TS+1'KUSR
430 CHAR,0,CC-TS,B$+A$(CC),1'DSVH
435 RETURN'BAQG
445 REM SAVE FILE'BIVJ
450 PRINT"[HOME2,L. BLUE]"'BAOE
455 CHAR,24,7,"[SHFT F]ILENAME
    :[BLACK]":WINDOW 33,7,47,7,1
    :PRINT"[GRAY3]"'DUSS
460 IP$="[SHFT @]."'BDNG
465 DO'BAJJ
470 GET KEY A$:P=INSTR(KE$,A$)
    :IF P=0 THEN 470'HSVN
475 IF P>119 THEN EXIT'EELN
480 IF A$=DE$AND LEN(IP$)>2 THEN
    IP$=LEFT$(IP$,LEN(IP$)-1)
    :PRINT"[LEFT,RVS] [RVOFF,LEFT]";
    :GOTO 495'MHJW
485 PRINT"[RVS]"A$"[RVOFF]";'BDVM
490 IP$=IP$+A$:IF LEN(IP$)=16 THEN
    EXIT'HQAP
495 LOOP'BAKM
500 IF A1$="L"THEN RETURN'EDJC
505 IF P<>120 THEN 580'EHWI
510 DOPEN#2,(IP$),W:IF DS>19 THEN
    745'ETSG
515 PRINT#2,CC:FOR T=0 TO CC-1
    :PRINT#2,Q$;B$(T):NEXT'HWAO
520 DCLOSE'BBNC
525 GOTO 580'BDMH
535 PRINT"[BLACK]";:WINDOW 24,9,54,23,
    1:PRINT" [GRAY3,RVS]"E$"T";'DTIO
540 DIRECTORY"[SHFT @].*"'BADF
545 GOSUB 450'BDMJ
550 IF P<>120 THEN 580'EHWI
555 CD=CC'BEPK
560 DOPEN#2,(IP$):IF DS>19 THEN
    745'ERML
565 INPUT#2,CC:FOR T=0 TO CC-1
    :INPUT#2,B$(T):A$(T)=LEFT$(B$(T),
    75):NEXT'JKSW
570 FOR T=CC TO CD:A$(T)="":NEXT'FMIL
575 DCLOSE'BBNM
580 GOSUB 120:GOSUB 170:GOSUB 220'DLRK
585 TS=0:WINDOW 2,14,77,23'CPAQ
590 FOR T=0 TO 9:CHAR,0,T,"[GRAY3]
    "+A$(T),1:NEXT'GRFQ
595 RETURN'BAQN
605 REM PRINT'BFCH
610 IF CC<2 THEN RETURN'EDRE
```

```
615 GOSUB 170'BDLH
620 CHAR,3,1,"[L. BLUE,SHFT T]URN ON
    [SHFT P]RINTER THEN PRESS [WHITE]
     [SHFT R,SHFT E,SHFT T,SHFT U,
    SHFT R,SHFT N].[L. BLUE,SPACE2,
    SHFT P]RESS [SHFT E,SHFT S,SHFT C]
    APE TO EXIT PRINTING.",1'BHIE
625 GET KEY A$:IF A$=E$THEN 730'FKHM
630 IF A$<>CR$THEN 625'EIFH
635 OPEN 4,4,7:CX=0:QN=0'DNIN
640 FOR T=1 TO 5:PRINT#4:NEXT
    :PP=6'GKVK
650 DO UNTIL PP>60:X$=B$(CX)'ENML
655 GET ES$:IF ES$=E$THEN CX=CC
    :EXIT'GODR
660 IF PR$(CX+1,0)=""THEN 675'ENKL
665 QN=QN+1:PRINT#4,STR$(QN)")
    "PR$(CX+1,0):PP=PP+1'HDJW
670 IF PR$(CX+1,1)<>""THEN PRINT#4,"
    [SPACE4]"PR$(CX+1,1):PP=PP+1'JDHT
675 IF LEN(X$)>64 THEN BEGIN:X=64'GLKS
680 IF MID$(X$,X,1)<>" "THEN X=X-1
    :GOTO 680'IPEQ
685 PRINT#4,TB$LEFT$(X$,X)
    :X$=MID$(X$,X+1):PP=PP+1'HCWY
690 BEND'BBXK
695 PRINT#4,TB$X$:PRINT#4:PP=PP+2'EPJU
700 CX=CX+1'CFTD
705 LOOP'BAKG
710 FOR T=PP TO 66:PRINT#4:NEXT'FIXG
715 IF CC>CX THEN 640'DHHK
720 CLOSE 4'BBLD
725 A1$="":GOSUB 170:GOSUB 220'DLCM
730 RETURN'BAQE
740 REM TRAP'BEWG
745 DCLEAR:PRINT"[HOME2,CLEAR,BELL,
    SHFT D]ISK [SHFT E]RROR"
    :SLEEP 2'DFYR
750 GOSUB 120:GOSUB 170:GOSUB 220'DLRJ
755 TS=0:WINDOW 2,14,77,23
    :FOR T=0 TO 9:CHAR,0,T,"[GRAY3]
    "+A$(T),1:NEXT'IIIY
760 GOTO 30'BCKH
770 DATA "[RIGHT6,SHFT P]RESS [WHITE]
     [SHFT L] [L. BLUE] TO [SHFT L]
    OAD, [WHITE] [SHFT S] [L. BLUE]
     TO [SHFT S]AVE, [WHITE] [SHFT P]
     [L. BLUE] TO [SHFT P]RINT,
    [WHITE] [SHFT R,SHFT E,SHFT T,
    SHFT U,SHFT R,SHFT N] [L. BLUE]
     TO INPUT.","[SHFT P]RESS [WHITE]

     [SHFT E] [L. BLUE] TO [SHFT E]
     DIT TOP LINE OF USER
     COMMENTS."'BBYW
775 DATA "[SHFT T]YPE YOUR INITIAL
    IMPRESSION OF THE WORK.",'BBGA
780 DATA "[SHFT I]S THE WORK A
    TRANSLATION, DIGEST, OR EXCERPT?",
    'BBCW
785 DATA "[SHFT W]HO IS THE
    PROTAGONIST AND WHAT OF MAJOR
    IMPORTANCE HAPPENED TO HIM?",'BBCI
790 DATA "[SHFT W]HAT IMPORTANT
    CHANGE OR REVELATION OCCURRED IN
    THE PROTAGONIST?",'BBBE
795 DATA "[SHFT W]HAT IS THE CONFLICT
    :[SPACE2]MAN VS. SELF, MAN,
     SOCIETY, OR NATURE?",'BBKH
800 DATA "[SHFT H]OW IS THE CONFLICT
    RESOLVED?",'BBOL
805 DATA "[SHFT W]HAT IS THE CLIMAX
    OF THE PROTAGONIST'S PROBLEMS?",
    'BBXV
810 DATA "[SHFT W]HAT EMOTIONS
    DOMINATE THE WORK?","[SHFT A]
    RE THESE EMOTIONS TOO STRONG OR
    JUST RIGHT?"'BBPA
815 DATA "[SHFT D]OES THE THEME
    CONTRADICT MY BASIC BELIEFS TO
    THE POINT [SHFT I] AM HINDERED",
    "FROM ENJOYING THIS WORK
    FULLY?"'BBOL
820 DATA "[SHFT W]HAT IS THE AUTHOR'S
    STYLE AND DOES IT AID OR HARM HIS
    THEME?","[SHFT I]S IT CONSISTENT
    THROUGHOUT?"'BBCE
825 DATA "[SHFT H]OW EFFECTIVE IS THE
    AUTHOR'S USE OF DIALOG?",'BBMV
830 DATA "[SHFT S]UMMARIZE THE PLOT.
    (NEXT 3 INPUTS)",,,,,'BFCQ
835 DATA "[SHFT D]ESCRIBE THE
    SETTING.[SPACE2,SHFT W]
    HAT IS THE STORY'S MOOD?",'BBBY
840 DATA "[SHFT D]OES THE ENVIRONMENT
    OF THE STORY PRESSURE THE
    PROTAGONIST INTO CHANGING?",'BBUC
845 DATA "[SHFT D]OES THE AUTHOR USE
    FORESHADOWING AND/OR SUSPENSE?
    [SPACE2,SHFT H]OW?",'BBAD
850 DATA "[SHFT I]F THE WORK HAS A
    SURPRISE ENDING, IS IT
    JUSTIFIABLE?",'BBHW
855 DATA "[SHFT I]S THERE ANY
    CONTRAST IN THE WORK
    : WITHIN PLOT, BETWEEN
    CHARACTERS","OR MOODS?[SPACE2,
    SHFT W]HY IS IT THERE?"'BBEN
860 DATA "[SHFT D]OES THE PACE OF THE
    STORY (SLOW, MEDIUM,
     FAST) CONTRIBUTE TO THE EFFECT?",
    'BBPD
865 DATA "[SHFT I]S THE PLOT
    SEQUENTIAL OR ARE THERE
    FLASHBACKS?",'BBOB
870 DATA "[SHFT W]HAT ARE THE
    DOMINANT TRAITS OF THE
    PROTAGONIST?","[SHFT H]
    OW DO THEY CONTRIBUTE TO HIS
    CHARACTER?"'BBLJ
875 DATA "[SHFT W]HAT IS THE
    RELATIONSHIP BETWEEN THE
    CHARACTER'S JUDGMENT",
    "OF HIMSELF VERSUS THAT OF OTHERS
    IN THE STORY?"'BBNS
880 DATA "[SHFT D]OES THE CHARACTER
    DEVELOP DURING THE STORY?",'BBUX
885 DATA "[SHFT D]O YOU THINK THE
    AUTHOR IS FAVORABLE TOWARD THIS
```

128 Mode/Socrates

```
     CHARACTER?",'BBTH
890 DATA "[SHFT I]F THE WORK IS
     COMEDY, WHAT TRAITS ARE
     EXAGGERATED?","[SHFT W]
     HAT MIGHT THE AUTHOR BE
     SATIRIZING FROM THIS?"'BBVN
895 DATA "[SHFT I]F THE WORK IS
     TRAGEDY, WHAT IS THE FLAW OF THE
     PROTAGONIST?",'BBCI
900 DATA "[SHFT I]S THE STORY TOLD IN
     FIRST PERSON (CHARACTER IN STORY)
     OR THIRD PERSON?","[SHFT W]
     HAT ARE THE ADVANTAGES OF TELLING
     IT IN THIS WAY?"'BBBM
905 DATA "[SHFT I]S THE THEME OF THE
     WORK HANDLED INTELLIGENTLY?",'BBRV
910 DATA "[SHFT I]F THERE IS
     VULGARITY OR IMMORALITY IN THE
     WORK, IS IT USED PURPOSEFULLY?","
     [SHFT M]IGHT IT INCITE SENSUAL
     THOUGHTS IN A NORMAL READER?"'BBIO
915 DATA "[SHFT D]OES THE AUTHOR
     RECOGNIZE AND CONDEMN THE
     IMMORALITY OF THE CHARACTERS",
     "EVEN THOUGH THEY THEMSELVES MAY
     NOT?"'BBGO
920 DATA "[SHFT H]AVING ANSWERED
     THESE QUESTIONS, HAS MY VIEW OF
     THE WORK CHANGED?","[SHFT H]
     OW?"'BBXA
925 DATA "END",'BBLL
```

END

Joy of Input

Continued from page 61

If you find the existing wire can't easily be repaired, you can still fix the joystick by replacing the cord with a kit.

play doesn't match the direction you are pressing the stick or is not continuous, either the cord has a broken wire or the port itself is defective.

If you have an ohms meter (a good one at Radio Shack costs under $20), you can use it to double check the condition of the wiring and pinpoint breaks. Before you use the meter, adjust it to get a true reading. Do this by touching the two probe tips together and turning the adjustment wheel until the pointer rests on zero. When you disengage the probes, the meter's pointer should move to the other side of the gauge window. Now you are ready to test the wiring for breaks. Press one of the meter's probes into the end of the joystick cord which connects to the computer's port. (You'll have to find out which wire on the connector end leads to which switch by trial and error.) With the other probe, touch the wires where they connect to the switches in the base of the joystick. While you are holding these two points, get someone to wiggle the cord. If the wiring has a defect, the gauge pointer will fall away from zero each time the circuit is broken. This means the wire is defective and should be replaced. If the wire is in good shape, the pointer will stay on zero. Note: The joystick connector has nine openings but only six of them are used for wiring. You can tell which are attached to a wire by visual inspection.

If you find the existing wire can't easily be repaired, you can still fix the joystick by replacing the cord with a kit. One kit I am familiar with is from a company called Gemini Industries (215 Entin Road, Clifton, NJ 07014, part number VG150). The one I used cost under $3 and included all the wires as well as the port connection.

Some of the newer joysticks like Epyx's 500XJ use micro-switches instead of mechanical metal gates. These can be tested with the same BASIC program, but repairing them is not as simple. If the problem you uncover is a bad switch, you'll need to replace the micro-switch itself (there is nothing to bend inside these). But if the problem is a loose or broken wire, repairing is just as simple as with the older type. Note: the Epyx 500 series carries a full five-year replacement warranty. Since all of the units in this series (at this writing) have been on the market for less than the warranted period—don't try to repair them, just return a problem unit for replacement.

Reviving The Mouse

The mouse is not as simple to repair as a joystick. If you open one, you'll see a circuit board complete with chips. Repairing these is a chore best left to trained hands. But by the same token, a mouse is less likely to require repairs if it is treated sensibly. I found the one on my Amiga dead unexpectedly one morning.

After inspection, I discovered that the children who had been playing with it the night before had dropped it on the floor. The impact had caused the elastic ball to wedge one of the controlling wheels inside its housing so it would not move. After I opened the trap door and removed the ball, all I had to do to revive the mouse was to push on the wheel gently. I was lucky. "Mice" are more susceptible to damage by falls and misuse than joysticks. But like little animals, these input devices will live to a ripe old age if cared for properly.

The mouse interprets user input when the two controlling wheels are turned by pressure from the elastic ball. The key to keeping it alive is to keep it clean. Don't use your mouse on a surface which is not squeaky clean. Even nearly invisible debris will stick to the surface of the ball and be transferred to the two controlling wheels and eventually cause problems.

If you want to keep your mouse healthy, you need to keep three things clean: the two controlling wheels and the ball. The ball should be cleaned weekly by just sliding open the trap door and wiping it with a clean cloth. If it is really dirty, wash it carefully with a mild solution of soap and warm water, but be sure it is powder dry before returning it to its cage. The two controlling wheels should be cleaned with a cotton-tipped swab and tape recorder head cleaner or alcohol. With time and use, these wheels will develop a residue track (a thin line of sticky "whatever" which the ball transferred from the table top to them). If this residue refuses to dissolve under pressure of the cleaner and swab, try a little direct pressure. Take a toothpick (or break one of the swabs in half) and gently chip the residue away. Follow this chipping with a thorough cleaning with the alcohol and swab. Be careful not to touch these wheels with any instrument which might gouge or pit them, since such irregular surfaces will eventually shorten the life of the ball and might cause the mouse to send erroneous impulses.

And just as you wouldn't pick up an animal by its tail, don't carry either your mouse or joystick by the cord. A broken or loosened wire is always more difficult to trace and repair than a dirty contact or wheel.

Isolating Other Problems

When trying to isolate an input problem, you have to remember that the computer itself, not the input device (joystick, mouse) could be the culprit. Though not originally designed for that purpose, the test program will let you check the condition of the ports as well. For instance, if your joystick checks out fine for port two, but doesn't work with port one you should suspect the port itself as the source of your problem.

A common killer of ports is static electricity which can be discharged into the port while reaching for the on/off switch on the 64 or 128. It is always best to touch a ground (metal filing cabinet, metal chair, etc.) before touching your computer, especially when the room is cool and humidity is low. A discharge from your finger can put more than your port out of commission if the discharge hits the wrong pin or has the right amperage.

If you want to keep your mouse healthy, you need to keep three things clean: the two controlling wheels and the ball.

Another culprit could be a bent or broken connection in the port. A bent pin will prevent your joystick or mouse from being inserted properly, and if the pin is gone (and is one of the ones which carries impulse signals) you'll have to replace it before you can use the port properly. Both of these repairs are best left to trained repair persons.

If you find your input devices are in good condition but your ports are not, you might check one other thing before taking the computer to a repair center. Providing your unit is no longer covered by warranty, open the case and inspect the back side of the ports themselves. There is always an outside chance that a wire has managed to come loose. If so, you probably can repair it yourself if you are handy with a soldering iron.

Back To The Boxing Match

Now all my own input devices are either 100% ready for work or permanently retired (trashed). My mouse goes where it's directed and my joysticks respond properly when they are pressed. With those repairs done, I'm ready to go after the middleweight championship of the *Star Rank Boxing* world again. So if you see my son, tell him I'm gunning for him, and my gloved joystick is ready to take on the best he can dish up. As Ali might say, "I'll dance like a butterfly and sting like a bee. And when we tangle he'll be sorry he messed with me. I'll take him in the fourth round and you can take that to the bank."

Well, maybe I won't beat him, but at least I'll have a fighting chance. And whoever loses won't be able to point to a faulty joystick for an excuse.

Conclusion

As always, an ounce of prevention is better than a pound of cure. It is usually cheaper and less time consuming to maintain your input devices than to repair them. But when a problem develops, the first thing you need to do is isolate whether it's in the input device, the computer or the program. If it is the input device causing the problem, you need to determine whether it is caused by dirt, faulty wiring or misaligned switches. Next decide whether you can repair the device yourself, need professional help or whether it would be cheaper to simply replace the device. ■

Amiga Software Reviews/The Three Stooges

Continued from page 32

squirt Curly in the face.)

The Boxing Event, inspired by *Punch Drunks,* is my favorite sequence. Curly is entered in a boxing match and must last six rounds with the Champ to win the prize money. The one and only way to rev up Curly is for Larry to play "Pop Goes the Weasel." Unfortunately, he breaks his violin and must dash off to find an alternate musical source. As the stopwatch ticks on and the rounds go by, Larry dashes down the street; with the joystick you control his speed and position on the sidewalk. You may never get to where you're headed (let alone back to the ring) as open doors, garbage, ladders, lamp posts and sleeping dogs block your way. After crashing into and tripping over obstacle after obstacle, I gave up in a fit of laughter.

Unlike most computer games based on movies or TV shows, *The Three Stooges* remains true to its original medium.

The most difficult event, Trivia, requires only your brains and an unbounded knowledge of arcane Three Stooges trivia. In this scene, you are given a multiple-choice trivia question. Get the answer right and win $500. Well, the odds are only three to one. By the way, which Stooge did appear on a Mexican TV quiz show?

After thirty days are up (or sooner if you managed to deprive poor Moe of all his fingers), the game ends and you are returned to Ma and her orphanage. If you earned at least $5000, you save the orphanage from foreclosure. For $10,000, there is enough left over to fix up the place. And if you're lucky enough to have earned at least $15,000, get ready for a triple wedding.

The manual contains a history of the Three Stooges career; the reference card has all the information you need to play. The only complaint I can express is that once the game ends, you have to reboot the computer to begin again. Loading time between scenes is rather slow, obviously due to the tremendous amount of graphic and audio data that must be brought in for each scene from the two program disks (which make a second disk drive practically a necessity here). If you're lucky enough to have a hard disk drive or an extra 1.5MB of RAM to spare, the game moves along at a lively clip.

Some skeptics might complain that the game is silly and has no significant plot. Well, the Three Stooges films were also silly and had no significant plots. Unlike most computer games based on movies or TV shows, *The Three Stooges* remains true to its original medium. Cinemaware has spent thirteen months developing a truly innovative program which dares to be different. Although replaying some of the scenes sometimes becomes tedious, I still find myself sitting back down at my computer playing the game just to have fun and relax. The manual quotes film critic Leonard Maltin, who observes that the public is made up of two groups—"one composed of persons who laugh at the Three Stooges and the other made up of those who wonder why." While the same may hold true for the Amiga gaming public, I predict that everyone who "experiences" this program will not only have fun, but will also truly admire the obviously painstaking effort that went into creating and producing it.

*[**Editor's Note:** Cinemaware has also released a Commodore 64 version of* Thee Three Stooges *available for $34.95]* ■

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sometimes it's hard to grab the M just right, and instead of moving it you find you've placed a tab on the Ruler. There's one other thing I dislike about the M's: it's hard to tell exactly where they point to. The M itself takes up 1/10-inch space on the Ruler, but what part of it is the actual margin?

You will find that simply moving around changing margins might not do what you want. The reason is that you need to select the text you wish to alter. If you merely change settings it will be for that paragraph only unless your cursor is at the bottom of the document in which case the change will be for all succeeding lines.

Version 2.1 also allows four useful options for justification. Again, click the box you want. Left-justify is the most common. This simply means all your characters will line up on the left margin leaving a ragged right margin. Right-justify means just the opposite. Don't think this is just a gimmick: right justified pages have a very nice, rather artsy look. Try them sometime.

Full-justify means both the left and right margins will be even. While most word processors offer this option, it is only with a bit-mapped system like GEOS that it can be done to my satisfaction. The reason is because the spaces inserted between letters are now micro-spaced. I personally have an aversion for printouts that are justified with a regular word processor because the inserted spaces are just too annoyingly noticeable. But with *geoWrite* it's a different story. I'm sold.

The last justify option is for fully-centered lines. Again, this isn't just a novelty. It looks great on handbills and announcements.

Tabs are also really easy to use. Point anywhere on the measured area of the Ruler and click. A little marker appears and you've got yourself a tab. You can click and drag it or get rid of one altogether by moving it to the top half of the Ruler.

Don't overlook decimal tabs. They're not just for numbers. I use them all the time when I'm typing tests. What they do is align a column of periods. Thus, when I'm making out a matching section of a test, I use a decimal tab to align the items which are all preceded by a letter and a period. Like this:

A. George Washington
B. George Shultz
C. George of the Jungle
D. Curious George

To make a decimal tab, you simply place a tab down, click it again, press the space bar, then click one more time. It'll turn a solid color to show it's a decimal tab.

If you ever decide you don't like the Ruler settings throughout your document and you want to start fresh, the simplest way is to choose "Select Page" from the Options menu (or press COMMODORE/V) then, while the text is highlighted, change the settings. Do the same for all subsequent pages.

As I said, I like *geoWrite*'s Ruler concept. The Apple Macintosh's main word processor, *MacWrite*, also uses Rulers but in a more clumsy fashion.

Fonts and Points: The concept of points for font sizes comes direct from the printing industry. One point equals 1/72 of an inch. Thus a 9-point font such as BSW font, means that each row of type will consume 11/72 inches of your paper. Why 11/72 and not 9/72? Because there are two points between rows. Since GEOS ordained 720 as the standard number of dot-rows per page, this means you can have 68 character-rows per page with a margin of about 3/4 inches left over at the bottom.

What about 6, 10, 12, etc. point text? This chart shows all:

Point	# Lines/page
6	93
9	68
10	62
12	53
14	46
18	37
24	28

Next you may be wondering how many characters can fit on a row? The answer to that is, it depends. It depends on the font type, size, and what characters you're trying to fit across the screen. With GEOS, each character is a different width. This is another difference and advantage of a bit-mapped based system. Thus, you could fit 288 upper-case I's in BSW 9-point font on one eight-inch row. That's right, 288. On the other hand, only 56 upper-case W's would fit. Keep in mind it also depends on your margins.

Headers/Footers: If you've used any word processor that doesn't allow headers and footers (as with the original *geoWrite*), you at one point or another started feeling cramped. You started wondering why the computer couldn't put the word "page" at the top of each page followed by the correct page number. Then, if you got hold of a word processor that allowed headers and footers, you went wild. You not only had the word "page" on top of and at the bottom of each and every page, you also had your name, your address, the Gettysburg Address, and more.

Version 2.1 allows headers . . . the best headers on any word processor I know of because: 1) they are so dang easy to use and 2) they are so dang versatile. You can have up to one whole screen of text in your header/footer. You can have the page, the date, even the time on each. You can also use all the special fonts and styles within your header text. And you can even include graphics in your headers. This allows you to create a company (or personal) logo and have it print at the top of each and every page. Nice, nice, nice. And by using the "Title page" option, you can keep page one different, which is important.

I won't repeat what the manual makes imminently clear. You just choose the Headers option from the Options menu and type in whatever you want. What's important to note is that you must put in carriage returns for any blank lines you want between the bottom of the header text and the top of your page text. You do this by pressing RETURN to create blank lines. Since *geoWrite*'s different fonts give you varying leftover margins, you will need to experiment with header and footer spacing to get what you want.

Maximums, minimums, and other stats: The manual includes lots of info but some of it is hard to find when you want it and some just ain't there. Here's my mini-list of important data:

—1100 words per page max
—62 pages per document max
—15 directory files per directory
— 9 fonts per menu
— 8 tabs allowed
—43 characters travelled if cursor right held down
—72 characters travelled if cursor tapped rapidly
—17 seconds minimum to cursor from top to bottom of page
—20 seconds minimum to cursor from bottom to top of page
—NLQ printing must be from Commodore 10 font

Well, all good things must come to an end. Next time I want to begin looking at how to Power-use *geoWrite*. And after that, some hard-core *geoPublish*ing. Until then, keep Pumping GEOS. ■

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box or this or that—something that must have cost big bucks. Then Peter would tell the story about his $2000 Amiga and a channel or two of ADO. [He chuckles] You could tell that some of them plain didn't believe us." Inova wrote a book called *Multiple Video Screens: The Video Production Manual* ($50) to help introduce people to the concept behind 3V and hinted at the step beyond, which he called Video Panoram™.

Hypothetically, Video Panoram would eliminate the borders between the screens to create one seamless image across all three screens. Cinerama had attempted to erase the seams in film with limited success, but no one had ever created a seamless panoramic video. After one of their multi-screen seminar presentations, a man bought a copy of the book and then disappeared back into the audience. A couple of weeks later he called Metavision and said, "Hi, I'm Jon Larimore with the National Geographic Society. Would you like to do a Video Panoram show?"

Inova recalls, "The answer was definitely yes! We told them that it could be done, but it would be expensive. That was all right with them, because they wanted a very special video for their upcoming Centennial to show the best of 100 years of National Geographic. They wanted a show like we'd done at Universal but without the seams. I had been waiting for someone to want Pano V ever since I first predicted it. Now I had to prove to everyone that Pano V works, and that it works all the time."

The National Geographic Centennial: The Inauguration of Video Panoram

"Beautiful . . . revolutionary . . . three pictures appear on the wide screen; they melt together to form two, then one marvelous shot of the earth and moon, or waterfalls, or the African savannas . . . as exciting as anything shown on IMAX," is how the *Washington Post* described the 15-minute "Honoring the Earth . . . Seeking the Stars," which debuted on January 13, 1988 at the Explorers Hall in Washington, D.C. Inova had proved to everyone that seamless multi-projector video doesn't just work . . . "it all but grabs you by the lapels," said the *Washington Post*.

The unique film, storyboarded on the Amiga, culled from 100 years of images in the National Geographic archives and narrated by Leonard Nimoy, bears an important message: we are "a single species among many, sharing a planet of wondrous beauty, delicate balance and complex systems . . . in which we all play a part." The screen for the show is 22 feet by six feet, although the Video Panoram format can expand to over 60 feet without apparent loss of resolution. Video Panoram is a variation of the NTSC format with a previously unattainable 350 × 1045 video line pairs of resolution for a wider and brighter picture that is sharper than a movie. Mayer explains, "The reason it's sharper than film is that you have full video resolution multiplied by three for the same area that you might cover with a single 35mm projector. There actually is more resolution with three times one inch quality. It's stunning."

The Amiga created the earth as a graphic on the opening shot, a powerful reveal reminiscent of *2001,* when the earth moves from behind the moon in outer space.

The show runs on Pioneer laserdiscs. Says Mayer, "It runs four times an hour, nine hours a day without a single hiccup in the entire presentation, but it has variable time options including a secret button to restart it from the top in case a dignitary walks in. It accommodates 100 at a showing, and they have the school buses lined up around the block.

"We put extra effort into this project out of love, admiration and respect for the organization. We used to keep time sheets and track everything; I got to the point where I didn't want to know." Says Inova, "We were probably working for 30 cents an hour." [Laughs]

The Amiga created the earth as a graphic on the opening shot, a powerful reveal reminiscent of *2001,* when the earth moves from behind the moon in outer space. Inova says, "I didn't want the land masses on the earth to look like today's land masses. I wanted a primeval earth off in the distance, so I digitized the earth and then retouched it. When you see it on a seamless panorama three screens wide it's very effective. It's one of those majestic shots that makes you gasp involuntarily. I knew that removing the seams was significant, but it wasn't until we had finished the online edit and used ¾-inch copies to put it up on a three-projector display system 25 feet wide that I realized how incredibly powerful Video Panoram was in comparison to 3V."

Inova and the Amiga worked together to cosmically storyboard the recreation of the world through a span of time to the present day; "I wanted to plan how long the scenes were so I could plan what I wanted in thematic material. By storyboarding on the Amiga, I realized that I was going to spend a lot of money on special effects that didn't exist as natural images, like spreading ocean floors, and what I really wanted to do was show the inheritance that's passed along in life in other ways."

But creating an entirely new form of video editing held hidden pitfalls that had to be overcome before the Metavision crew could turn in a seamless production. Inova remembers, "Our editor Peter Cohen and I had to compensate for the lack of complete understanding in other production cycles at every step along the way. There were no examples to show people, because this had never been done before. The poor people doing the film-to-video transfers had no idea what they were doing." Each portion of film required three passes for transfer to left, center and right videotapes which had to be registered perfectly both in physical alignment and in time placement to create a seamless panorama. Inova arrived at the online sessions with ten parallel edit lists, and he and Cohen experimented with various ADO effects to check the seams between the screens for perfectly seamless matching.

As if that weren't enough, Mayer, ever the creative producer, asked the fateful question, "What about zooms?" Says Mayer, "Peter had developed a technique for doing zooms, but it's like being a stunt man. You have to figure out how much you can load onto a new concept before you crash and burn.

Adds Inova, "We were creating pans by having a computer-controlled camera crawl across these 11 × 14 and 16 × 20 prints we'd gotten from National Geographic. To add zooms so that all three panels would shrink at exactly the same rate was asking too much. We may try this on the next project, but we'd already spent more than enough money trying the camera moves on this one. My education in video has cost over a million in on-line time over the years to get way out on the cutting edge."

Cutting Costs with a Cutting Edge Computer

Pushing the edge of the envelope with the proper amount of care has helped

Metavision keep their doors open while many of their competitors have gone down in economic flames from lack of caution. This is the thorny question that all production companies in Hollywood have to ask themselves—how far out on the ragged edge of technology is far enough?

By experimenting and taking risks in an off-line setting with his cost-cutting Amiga, Inova has helped Metavision to stay at the forefront of his art without going broke in the process. Sometimes even the innovative Inova skillfully combines an old technology like rotoscoping with his new techniques to enhance both. Says Inova, "Universal wanted us to demonstrate a new attraction under proposal for their tour. But the blueprints had tiny little blue lines on white paper that just wouldn't digitize, as well as extraneous details that would just distract from the presentation. So I pointed a camera at the blueprint and ran its output into the genlock. Then I traced over the useful sections in *DPaint,* coloring them in groups which I ordered by their appearance in the presentation. So as the speaker described each section, it faded in, which was a video effect we used later on."

Inova used rotoscoping to create a logo for Universal/Florida as well. First he rotoscoped the logo for Universal Studios in California into the Amiga, created an Amiga letter design for the word *Florida* and made stencils of both designs. He used the Paintbox to add fine shading and composited the two designs together for the final result. While the Amiga saves them money, Mayer says, "Computers don't save time; but you will go further levels deep and play around more. You'll poke at it longer and harder because of the convenience of the box." Inova agrees and adds, "You go for a higher level of refinement, because you don't spend all your time just to get a decent rendering. So you end up with a better image in approximately the same amount of time."

Although the Amiga may not save them time, sometimes it can save the day. A job for the Food Business Network described the advantages of their satellite transmission of accurate, up-to-the-minute information about the food business. The selling point of the service was that the signals were scrambled so that only authorized customers could receive the information. They wanted to show the decoder box, but there was a hitch—no one had built one yet—it was still in the design stage. With the Amiga, this was no problem for Inova; he simply rotoscoped in rendering of what the decoder would look like and then overlaid that onto video, placing the Amiga image atop a VCR image. To project an added air of realism, he duplicated the lighting and shading on the VCR onto the non-existent decoder. As a final touch to this computer reality, he had a live actor reach into the scene and hit the play button on the VCR. No one seeing the clip would ever suspect that the decoder wasn't real!

The Amiga also created the flying Yamaha logo in the opening screen as well as the shimmering ocean of electronic water.

Amiga Entertainment on the Yamaha Home Theater

When a story defies words and demands pictures, then Inova really puts the Amiga to work, like when Yamaha needed a videodisc to demonstrate their new Home Digital Theater, which is a entertainment theater in your home with digital audio sources and high-quality laser disc pictures. Says Mayer, "It is quite spectacular, but the world isn't asking for it because they don't even know it exists. So Yamaha asked us to create the killer of all killer demonstration discs to tell their story consistently, accurately and spectacularly. This is what the laser disc was always meant to do."

There were so many Amiga graphics on the Yamaha disc that Metavision also contracted Jeff Bruette and Cris Palomino of Prism Computer Graphics. Bruette designed one particularly useful graphic of the DSP1 (Digital Soundfield Processor) to fit the narration. The DSP1 is a digital reverb device for the home market so people can dial up any size room sound they like to create an audio hologram that recreates the magic of live sound. A computer graphic can clearly illustrate the aural impact of DSP surround sound. Inova admits, "We could have done that graphic on anything, but the Amiga is just fine. And we saved a lot. We saved more on this one job than the cost of an Amiga."

For Yamaha's hundredth anniversary the Amiga also created a flying Yamaha logo in the opening screen as well as a shimmering ocean of electronic water. Inova created his electronic water as a sinusoidal color cycle with a fade up to blue and a fade down to blue. He took one brush, stamped it on various-sized grids, and then stencilled them into the background.

The water effect of raindrops striking the water in luminescent expanding circles started as another *DPaint* graphic, which Jeff Bruette created as a flat circle which expanded as it color cycled. The ADO tilted the graphic back onto an angle as the final ocean of water. Inova uses the ADO on his Amiga graphics all the time, a technique he finds "simple, but incredibly effective." As you watch this stunning Yamaha videodisc, the Amiga graphics blend together imperceptibly with the higher-end graphics; in the visual richness of the total effect, it is hard to say where the Amiga begins and the Paintbox ends.

Simple but effective is the whole story of the way that Metavision uses the Amiga. In the high-end world of Hollywood video where mega-costs are the rule, there is a snob appeal to high-end production tools that is difficult to resist. But Metavision sees technology simply as tools awaiting their proper uses.

The Philosophy of Metavision

Peter Inova sums up the Metavision philosophy in an attempted illustration of the volcanic eruption of Mount St. Helens for the National Geographic Video Panoram show. He remembers, "Someone had actually shot a Mount St. Helens sequence before it blew up and an after shot done from the same spot with the same Panolux camera. We wanted to dissolve from one to the other; in between, we wanted to show the four critical shots of Mount St. Helens exploding before your very eyes. We tried many different ways of putting those into dissolves and into a telescope effect of one panel over another panel to show how the actual moment was. But we just plain never got it to work graphically. After we spent probably $2000 trying, we had to abandon the whole idea and use other material.

"But the person who watches the final show doesn't know what you tried; they only see the final result . . . and that's really the most important thing. The person watching the show hasn't a clue what your production tools were, and they don't need to know. If the image is strong, powerful, visceral and communicative, then you have a working communication. And if it's an Amiga that gives you that result, then you can chuckle to yourself that it didn't cost you an arm, a leg and a Paintbox to do it." ■

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about, new ones emerging from bubbling vortexes. Destroy the vortex with your crossbow or a Death Spell, but prepare to suffer heavy damage. Your best bet is to simply tiptoe around the snappers.

Ghosts also appear at the upper levels. These wraiths pose a double threat with their ability to pass through walls. Shoot their vortex if you can, but keep moving at all costs.

Whirling dervishes are particularly nasty creatures that not only remove health points, but also rob your character of his possessions. Use Death Spells to destroy dervishes and their vortex. Use it or lose it is the general rule here.

Mad mages populate lower levels. These fireball-throwing demons are extremely difficult to kill. They evolve from vortexes, so stock up on Death Spells whenever possible.

Monsters always appear in large numbers and often mingle among different species. The darker the monster, the more damage it can do, and the harder it is to kill.

A save game feature allows players to stop and restore games in progress. Use this feature each time you enter a new level. If you die, you can restore your position without having to start from the beginning. This is especially true for two-player games if only one player dies.

If you mistakenly disturb the snappers, retreating to the previous level will return them to slumber. Snappers are often in such abundance that this is your only choice.

As if 100 levels weren't enough, the designers have included a complete dungeon construction kit. Between the user-friendly nature of the level editor and the helpful user manual, players will soon be constructing demonic dungeons to share with fellow stalkers.

Every aspect of the game can be positioned and assigned special values and attributes. Goals and conditions can be set. The use of graph paper is helpful when designing a level's basic floor plan. Play test each level and polish up the rough edges. You can even use the editor to play levels from the original scenario. Overall, the dungeon editor not only allows you to extend your enjoyment of the game, but it also provides helpful clues to basic gameplay.

Demon Stalkers is a fast-action powerhouse that supplies the three ingredients of a classic game: easy to learn, challenging to play, and nearly impossible to master. It doesn't get much better than this. ■

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guishable from you, not only by their uniforms which are blue, but also by their guns which make a different sound than yours.

> The screen is in a constantly scrolling, 3D perspective, which makes the combat so realistic that your teeth chatter every time you get shot at.

In *Airborne Ranger* you will encounter two different types of bunkers. The first type can be taken out with a fragment grenade, the second requires a little more fire power (such as a LAW rocket). It is up to you to take any, all, or some of the bunkers out, but you must be sure and complete your goal. What you must do to complete your mission depends upon which one you choose. However, you can be sure that no matter which one it is, the enemy will go out of his way to stop you. You'll have to use brains along with muscle in order to complete the mission and make it to the pick-up point.

The Map

At any time during the game you may see a tactical representation of the whole area you are in by pressing the RUN/STOP key. When you do so, you will see the entire mission area with many graphic symbols. These symbols mean different things—an X indicates the location of one of your supply pods; a blinking stick figure indicates your current location. The symbols are too numerous to mention here, but I will assure you that they are easy to learn, and you will be glad that you did.

Summary

Airborne Ranger is the most realistic combat game I have ever seen for the Commodore 64! It combines fast-paced action along with some good old-fashioned war strategy to make it every computer soldier's dream. This is one game that will never get old, because of the many missions and difficulty levels that are available. The manual is concise, easy to read, and even gives some helpful hints for staying alive. A keyboard overlay is provided to help provide non-stop action. If you want to live the life of danger, pick up a copy of *Airborne Ranger!* ■

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screen at the same time. I'd also like a good animation controller to handle single frame recording of animations from the Amiga.

"The Amiga is working in ways that we never expected."—*Romanoff*

Tony Gomez
Hughes Aircraft

I am working at a professional industrial video production department called an in-plant facility, for a major aerospace company, Hughes Aircraft. We do everything you could imagine. Our sophistication is one-inch tape, so you can imagine what is possible. With all that in consideration we still lack a cost-effective computer graphics workstation. I am trying to convince management here that we need something like an embellished 2000 with appropriate software and hardware.

We have people here who are called the "computer czars." They set the company standards. It used to be that they said MS-DOS was the only way to go. Now that is happening again in computer graphics with the Macintosh. They are starting to think that is the only way to go. We are trying to head that problem off at the pass, at least in our own group by introducing what I believe is a more cost-effective alternative.

The setup that I use is based on the Sony Beta 1000 editing VCR. I use the Amiga 1000 with an additional 2MB of RAM, the SuperGen and the Amiga 1300 genlock.

Mike Medwid
Animated Presentation Graphics

I did a job for Apple, actually the engineering group needed a last minute presentation put together for their board of directors. So, I used *Video Titler* and *DeluxeVideo* on the Amiga, and put a little animation together so that they could show off the Macintosh to Apple's board of directors.

I have done jobs for Health Education Services, a piece used to show to prospective clients, storyboards for a comic publisher, still video art for music concerts, whatever comes along.

The video output of the Amiga is the main area of caution for anyone working with the Amiga. You cannot rely on the output from the 1000. With all of the machines you need something to give you better quality video, like the SuperGen. I would like to see more hi-res animation tools.

Andy Romanoff
First Light Video Publishing

Why the Amiga? Because it was powerful and affordable. It was the only thing that came close to having its capabilities that was affordable for a startup company like ours. I looked at a number of PC-based products, I looked at Targas, that sort of stuff. I immediately saw that I was going to be at $10,000 before I started to do any work. So we looked at the Amiga when there was only the 1000 and no genlock, and I just kept keeping tabs on it when I went to shows, because I knew that this was going to be the machine. With the introduction of the 2000 and the SuperGen we jumped in and bought one.

We used it to produce titles for our first production, using the JDK *Pro Video Titler.* We had to go through all the craziness that everyone goes through to get professional quality the first time they use an Amiga. We ran it through a full frame still store and then keyed the titles separately. This was before we got the SuperGen. Now it is much simpler.

We now have the new JDK software that lets you import full-screen background images, but it is very memory intensive, and there are still some limitations. So what we do is create the graphics in *DeluxePaint,* and use *DeluxeProductions* to change from image to image and run the JDK program on a separate Amiga, and layer the two images using two separate genlocks, one downstream from the other. It is so affordable, once you've got the software, you just buy a second 500. You don't even need a second monitor, you can switch back and forth. So for just the cost of a 500 and a second genlock you can create very complicated images. You just decide how many bitplanes you need. They cost you about $500 for four hi-res bitplanes.

As we got into production we realized that we did not have time to get expert on every aspect of the software available for the Amiga, so we hired a local computer artist named Christopher Reed. He is doing our graphics for us on his machine at home, and we will use our Amigas to move them to tape when he is done. The surprising thing is that we had always envisioned having PC's in the office for a variety of things, but we just ran out of money for buying more computers. The Amigas have become the office workhorses. We purchased *WordPerfect,* and use it in the office. The Amiga is working in ways that we never expected. We thought it was only going to be a graphics computer.

On our new production we are using the Amiga to create full-screen graphics and animations, primarily color cycling, simple animations. We are creating over 100 images for use in the program that will demonstrate all kinds of acoustic phenomenon—the transducers where sound is turned into electricity, that sort of thing. What is really exciting is that all of the drawings that we are doing have existed for many years on the printed page. They have always needed deciphering because something happened across time, and all the drawing could show you was the instant—you had to figure out what's going on. Now we show the diaphragm of a microphone being pulsed by a moving pressure wave of air, and how a sine wave develops as a result of that pressure. You get to see it happening on the screen. The concepts are made clear.

These are part of a series called "Sound Recording," and all of the graphics we are currently doing will be part of three one-hour tapes that will eventually be part of an eight or nine part series.

I believe that we will lean on the Amiga more and more in the future. For example, when we first scripted these shows we were not certain that we would have any graphics beyond the traditional type where you have flat art and you point a camera at it or maybe you use two pieces of artwork and dissolve between them. Then what happened is that we got Christopher involved. We explained to him the concepts we wanted to illustrate, and he came back with images and said, "If I make this move. . ." and we suddenly realized we could do a lot more.

I think what will happen in the future is that we will design our graphics with a much keener appreciation for the capabilities of the computer. I bought something just to do titles with, and it has become a much more important part of the business.

If I didn't have the Amiga to use I would not have bought graphics from an outside vendor. I could not have afforded to. I would have done things more simply. I would have had to have settled for not just inferior looking graphics but inferior teaching graphics. What is terrific about the Amiga is that once you have done the basic drawing it is so easy to get some movement into it. You get a much stronger conceptualization. ■

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> **"There was an attempt to move *Lane* away from the satirical, Flash Gordon-type character toward a more obvious, adolescent level of humor."–*Meretzky***

Designing the story for *Lane* was a new experience for Meretzky and one that he would be happy to do again. Because he worked in interactive fiction for many years, he found it nice "to work with new people and have the ability to work for only a month or two on a new project rather than almost a full year. I was able to get a breath of fresh air without devoting too much time." Let's hope that Meretzky scripts another Infocomic, for his distinctive humor and storytelling abilities shined through on *Lane*. Because *Lane* was the first Infocomic, Meretzky and TSP were more careful to not overstep their limits and take too much of a chance in the implementation of the story. As Steve mentioned, "We decided to use only the most basic possibilities, because it would be the first in the new product line, and people would still be getting used to the idea. The technique of 'jumping' is so effective that you have to be careful not to overuse it. It's almost a lazy way to link the story lines. Ultimately, you have to make sure that there are no inconsistencies—you have to maintain a regularity of jumping, but not have too few or too many jumps."

The end result of the cautiousness of TSP and Meretzky is a story that flows smoothly and really shows no "bugs," per se. Meretzky found one weakness in that the story starts out in the viewpoint of Zabor, even though Mastodon is the main character. I really found that not to be as awkward as he might think. Still, there were some changes in the end product. According to Meretzky, "The story originally began in Zabor's office, and the prologue was added during testing. Also, the first Wilhelm looked like Otto Preminger, and I had envisioned another type of character—so we changed his appearance."

These changes were minor. More interesting than the differences between the original and final story is the inclusion of the Siskel and Ebert-type characters in the guise of a Blubberman and Thin Man. They pop up during the game as if they were reviewing it from a private studio; they even give the story two "thumbs up" at the end. Meretzky mentioned a historical note about *Lane*, "Originally, in addition to jumps, Infocomics were going to have 'triggers' that would prevent you from going further in the story until you saw a certain viewpoint. Those characters were supposed to be a mechanism to keep you from going too far into one story line before you saw another one. Even after the idea of triggers fell through, the characters stayed in there."

> **"There is much more of a chance for true character development, and that will ultimately be the driving force behind Infocomics."** **–*Briggs***

In the final analysis, *Lane Mastodon vs. The Blubbermen* was an appropriate introduction to Infocomics. I thoroughly enjoyed the characterization, Meretzky humor, intricate story line, animation and all the other elements that make up the piece. As any good comic book should, *Lane* describes Mastodon's origin as a superhero and leaves the ending open to be picked up in the further adventures of the main character. From beginning to end, *Lane* measures up to the original vision of Infocom and TSP.

Gamma Force in Pit of a Thousand Screams

Along the same lines of *Lane Mastodon vs. The Blubbermen, Gamma Force,* or *Pit* as it is affectionately known by its author Amy Briggs, Infocom and TSP, is in the science fiction genre. The story takes place on an unusual planet that is the dominion of three superheroes joined by a common goal. *Gamma Force* is the story of a waterbeast named Eskobar, a human being named Ratchet and an elfin princess named Elena who are joined as one to defeat the evil Nast, who is bent on taking over the planet Zuron. What makes Zuron such a catch for Nast is the drug XT-3, an addictive substance which is very precious and found only on Zuron.

Gamma Force has many more characters than the first Infocomic, and the character development is a little stronger. Author Amy Briggs told me in an interview that I conducted for her first Infocom venture, *Plundered Hearts,* that she especially likes characters who are emotionally linked and well characterized. *Gamma Force* allowed her to use her talents. She related, "There is much more of a chance for true character development, and that will ultimately be the driving force behind Infocomics." Although the plot of *Gamma Force* is entirely her own, Briggs mentioned, "Writing a script was like adding captions to a cartoon. The difference between *Pit* and the other Infocomics is that is was half done by TSP before I even began. It didn't even have a story. The characters were used as prototype examples of what you could do with the development system. My assignment was to go in there and write a story based on what they had already done."

Anyone who watches *Gamma Force* will agree that Amy tied everything together quite well. The story is well-told and even uses a unique flashback device; the bulk of the tale takes place in a past memory of Elena, with only the beginning and the end happening in the present. Indeed, *Gamma Force* is so well constructed that in many of the viewpoints you don't ever find out what the *Pit* in the title is used for or even visit it. Briggs explained that TSP and Infocom did this in order to "purposely hide some of the story underneath that people hadn't seen, so they would stop and wonder where those parts came from and get more into the story. This was our technique for having people go through *Gamma Force* more than once." The attempt worked on me, for only on my third or fourth time through the story did I discover the purpose of the Pit in the title. But, I won't tell you!

Briggs found the collaboration on *Gamma Force* refreshing and one of the few times when she felt as if she were actively working with somebody else on a common project. She remarked, "There was a lot of give-and-take, and we really built upon each other's efforts. I thought up the powers for the *Gamma Force* members, and TSP thought up the origin of those powers. Putting them together, we had our superheroes."

There are three main characters in *Gamma Force:* Elena has powers that

deal with the air and earth. Ratchet uses fire as a source of strength, and Eskobar finds his super skills in water. Briggs liked the fact that the powers revolved around the four elementals. She liked creating Volvox the robot the best, for she had always wanted to work with a stereotypical robot character. She described the mission of *Gamma Force*: "to make sure that evil doesn't take over. Obviously, you can't eliminate it entirely. The Gamma Force is a check against its spread."

Because any good comic book collection is incomplete without a good superhero team, I'm happy that *Gamma Force* is a member of the Infocomic family. The story that unfolds revolves around the pasts of the trio and their meeting, as well as their capture and elimination(?) of the Nast. I only hope that we get to see the team again soon, for their unlimited powers are what make them so interesting. Until then, whet your appetite for superhero fare with *Gamma Force*.

Zorkquest: Assault on Egreth Castle

The third Infocomic to be released is also the first to spawn a sequel. Revolving around a couple of locations consistent with the Zorkian universe of the text adventure games, *ZorkQuest: Assault on Egreth Castle* is my favorite of the three Infocomics. I like *ZorkQuest* best because the *Zork* and *Enchanter* trilogies are my all-time favorite adventure games; *Zork I* was the first text game I ever played—but to each his/her own. *ZorkQuest* incorporates the best graphics and effects with the most well-developed characters of the series.

Each story combines interesting characters and twisting plots to provide a source of entertainment well worth the $12 price.

Ironically, the author of *ZorkQuest,* Elizabeth Langosy, was handed the story to continue after veteran Infocom writer Dave Lebling had to give it up to attend to prior commitments. Also ironic is the fact that Langosy was Infocom's long-time staff writer before tackling *ZorkQuest* and found a new outlet for her talents in Infocomics. Elizabeth said, "I spent many years writing fiction before I came to Infocom, and that's always been my true love. Originally Dave Lebling was going to do the game, and he's the one who initially developed the caravan members. He had the basic plot of a group of characters who are manipulated by an evil magician. Everyone here knows I write fiction, and because there are fewer developers here now, it was a natural choice for me to continue Lebling's work."

ZorkQuest is the story of a group of very different characters who meet and decide to travel together. On the way to their destination, they discover a ruined castle inhabited by an evil magician. He captures them, and the bulk of the story revolves around their attempts to escape the castle and defeat the magician. The evil wizard Radnor is one of Langosy's additions to the story character-wise. The plot is entirely hers, based on the characters Lebling had introduced.

"We attempted to emphasize the story and characters more in a unique way rather than make another puzzle-based adventure."—*Snyder*

Langosy found a more rewarding experience at TSP than did her other author friends at Infocom. She attributes this to the fact that *ZorkQuest* was the third Infocomic, and the development system was well-understood. "I worked with TSP more closely than Amy or Steve did, and that worked out for the benefit of the story. I had a good idea of the plot and the characters from the very start, and I felt very close to it." The collaboration shows in the final product, for it is most definitely the most visionary of the three in drawing you into the story.

In addition to the first *ZorkQuest,* the sequel should be out about now for all you *Zork* nuts. Langosy talked to me about the sequel, which she had nearly completed at the time. She explained that it was subtitled *The Crystal of Doom* and the plot revolves around "two seedy magicians who live in Accardi-by-the-Sea and have found a potential for a great force of evil that requires three magicians. The story is about their attempts to attract Radnor to their plans. The sequel uses different types of animation and more interesting

"We can move into so many different areas with this medium. Particularly, I'd like to see an adult suspense thriller Infocomic."—*Langosy*

jumps—into symbols that appear in the sky and things like that."

Langosy has developed her writing talents over the years by practicing fiction on the side and authoring all of the text in the game manuals and packaging at Infocom. *ZorkQuest* also shows her abilities to weave a good tale, and I hope that she develops many more products for Infocom. When asked about the future of Infocomics, she told me, "We can move into so many different areas with this medium. Particularly, I'd like to see an adult suspense thriller Infocomic."

Conclusions

This last thought of Langosy's seems to be the predominant feeling about the direction of future Infocomics. They are testing the waters with comics before trying to move into new areas with more mature stories. I only wish that I could provoke those involved to get moving on such ideas. Tom Snyder mentioned a story line to me that I can imagine as a good novel and as an even better Infocomic. The stage is set for such a jump into the adult theater. Let's just hope that the actors are present and accounted for on the next Infocomic disk.

I have found each Infocomic to be a most rewarding and entertaining experience. The premise of the "jump" is something that can only be fully understood if seen firsthand. The possibilities are endless, the stories will get more complex, the graphics will get better and the effects more spectacular. As long as TSP and Infocom continue the series and produce new stories using the same medium and maybe a new series title, what began as an attempt at a new way of storytelling will blossom into the most successful new type of entertainment software since the text adventure.

Thanks go out to Tom Snyder, Steve Meretzky, Amy Briggs and Elizabeth Langosy for taking the time to be interviewed for this article and to Eileen Milauskas, Public Relations Director at Infocom for setting up the interviews.

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When I finally located the radar control bunker, a HARM missile was deployed to put it out of action. Most of the return trip, however, was uneventful. Approaching the carrier America, I prepared to touch down.

MicroProse landing simulations have come a long way over the past few years. While *F-15 Strike Eagle* was rather forgiving, for example, *Project: Stealth Fighter* is a whole new experience. You have to physically catch the wire on the deck, or initiate a "go around" to try to land again.

Before the player begins a mission, he has to go though a series of menu screens. First the pilot must identify the picture of a military airplane (U.S. or possibly even an enemy aircraft). By choosing the correct answer from a long list of titles you earn the right to select your next assignment. A wrong answer automatically places you in a training mode. Training exercises give you the opportunity to bomb unprotected targets and participate in air-to-air combat, where surface-to-air missiles are conveniently absent from the region.

Next is the pilot record. Every player must format a separate disk, in order to keep a record of his glorious career. I like this way of doing things because it allows many pilots to exist on file. Other choices the user has to make include the level of conflict, experience of his enemies, flight performance characteristics and the geographic region for missions.

The final menu allows you to go on leave, select a new mission (after evaluating the statistics of the present one), examine the current intelligence and mission briefings, and if everything is acceptable, arm your plane. This entire operation is ultra user friendly and can be completed in less than a minute.

Project: Stealth Fighter also contains some of the sharpest flight simulator graphics I've seen to date on the Commodore 64. The cockpit layout is very impressive. Every indicator on the control panel looks good and seems to operate correctly. I also like the color scheme the programmer used. Objects on the ground and in the air would definitely look nicer if they were solid colored figures, but that may not have been possible. Sound effects in the program are good, but most consist of simple cockpit warning signals and variations of the jet roar.

The operations manual is 120 pages long, contains a library of information, and explains things so that everybody can understand them. You will even find evasive maneuver and air combat lessons, supported by a series of easy-to-follow diagrams. I have never seen a more comprehensive software manual. Every question I came up with was thoroughly covered.

Jermaine: How would you rate the performance of MicroProse's Stealth Fighter?

Havener: Compared to the performance of the *F-15 Strike Eagle,* the F-19 doesn't have the power of its larger cousin. This type of jet has no afterburners (the source of the F-15's power) because they tend to leave a telltale radar signature. Since your engines are recessed within the aircraft anyway, a certain amount of power was automatically sacrificed due to the design of the plane. This all boils down to the fact that you can't perform too tight a turn, or climb at too steep an angle, without risking a "stall out" you might not recover from. Incidently, the overall performance of the craft is a bit sluggish.

Jermaine: How well does this simulated stealth technology work?

Havener: Most people don't realize there's a right and wrong way to take advantage of the F-19's stealth design. Certain rules must be followed to the letter for the craft to become and remain virtually undetectable on radar. When done correctly, however, the plane seems to be invisible in areas where a number of SAM missile sites exist. However, there is still the problem of being visually sighted from the ground or by aircraft.

Jermaine: Did you discover anything interesting about *Project: Stealth Fighter*?

Havener: I recently accepted a Persian Gulf mission, where I participated in a dogfight against American made F-4's (carrying American-made weapons). Now that was an interesting situation.

Even though I've never flown a military aircraft before, the MicroProse family of flight simulators all fly and respond like I imagine the genuine item would. *Project: Stealth Fighter* is no exception. If you liked *F-15 Strike Eagle* and *Gunship,* you'll fall in love with their newest creation. It's the cream of the crop.

Jermaine: I wish to thank Randy Havener for helping me review this product, and I agree with his final comment: *Project: Stealth Fighter* is the cream of the crop. ■



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prisingly this animation is not in the HAM mode, but is instead just a 32-color animation (which shows off one of the features of DBWRender). Therefore, this animation is not nearly as good as a HAM version would be, although for a 32-color animation it is very good indeed.

Cramden: by Bill Barton
(AmigaZone file #11726)

These are the Cramden Utilities, which are Amiga versions of the famous MS-DOS Norton Utilities.

SI is the far more interesting of the two utilities. SI creates a quick specification sheet of your Amiga. SI first lists the versions of Kickstart and Workbench that are running in your Amiga. Next are listed the vertical blank and power supply frequency (which will vary depending on the country you are in). The video mode (NTSC or PAL) is listed, along with the maximal and normal display size. Also listed is the pixel aspect ratio (the physical dimension ratio of a pixel on the screen). The amount of installed memory is listed along with each segment of memory and its place in the 16 MB memory map.

However, the most interesting set of figures in SI clearly are the performance benchmarks. Unlike Norton's SI, Cramden's SI has two benchmarks. The first benchmark compares computing performance to a stock Amiga 1000. The second figure compares computing performance to a stock IBM PC/XT (for those who are used to comparing Norton SI figures). On my Amiga 2000 with a 68010 installed, Cramden SI reported a 1.2 for the Amiga 1000 benchmark, and a 3.9 for the PC/XT benchmark.

I feel the PC/XT benchmark is unfair, since I doubt that it takes the Amiga's graphics co-processor into account; therefore the PC/XT benchmark figure should be double what it reports now. (That would put this 68010-equipped 2000's computing performance on par with a PC/AT clone running at 8 MHz, whereas not taking into account graphics co-processing puts this Amiga on par with just a PC/XT clone running at 10 MHz.)

GrabANIM: by Gary Bonham
(AmigaZone file #11730)

Here is a set of must-have files for anybody interested in animation on the Amiga, especially for anyone who is interested in the IFF ANIM format. The main program, GrabANIM, will capture a series of graphic screens and convert them to an ANIM format animation. What does this mean? Well, for starters, you can capture a scene from an arcade game and then run the created ANIM format to show the game off to your friends without actually running it. (Note: I do not suggest you give this animation to your friends, since I am not sure if that would be legal in the case of a ANIM scene originating from a commercial piece of software.)

You could also use this program to record Amiga sessions in order to demonstrate certain techniques. This method would gobble up memory much more quickly than using an input recorder/player like Journal, however, the user on the receiving end would not have to have the host program.

You could also use this as a compressed slide show, recording an IFF picture slide show program with GrabANIM, then playing back the created ANIM instead. (Since the ANIM format contains only the changes between each frame, this can greatly reduce the disk space needed to store the slide show.) Also inside this archive is the complete IFF ANIM format specification as created and maintained by Sparta Inc., originators of the ANIM format. The latest version of ShowANIM (version 4.3) is also in this archive. The main new feature in version 4.3 is that you can now create huge ANIM's that span across multiple floppy disks, and ShowANIM can still play the entire animation. Last but not least, there is a wealth of C source code on this disk for those programmers who would like to see what is going on here.

KillVirus: by Tony Solomon
(AmigaZone file #11731)

A tiny program that will kill any virus that happens to reside in memory.

Peri: by Gregory Kendall
(AmigaZone file #11643; Shareware: $15)

Are you tired of having to endlessly input X, Y and Z coordinates for your *VideoScape 3-D* objects? Well Peri might be able to ease the strain for you. Peri will allow you to load an IFF picture, trace any object in the picture and convert the tracings into a Points section of a *VideoScape 3-D* object geometry file. Peri allows you to pick which two axes you wish to work with and specify the coordinate value of the third axis which is not being used. You can, however, use autoextrusion to create objects with a constant depth in that third dimension. You can set a scaling factor to any traced object and choose where in the picture the origin will be placed.

Popman: by David Ashley
(AmigaZone file #11532)

This is a demo of a *Lode Runner*-type game (the game itself costs $20). The audio/visual aspects of the demo aren't very impressive, but since I don't know of any faithful *Lode Runner* imitations in the Amiga commercial sector, you may still be interested in this game.

QRT: by Steve Koren
(AmigaZone file #11733)

QRT is a ray-tracing package that is intended to be both powerful (like DBWRender and *Sculpt 3-D*) as well as fast (like Eric Graham's RT program). QRT has extensive error checking when processing the input files, so unlike DBWRender you don't have to worry about improper parameters crashing your Amiga. QRT allows you to define custom quadratic surfaces (as opposed to triangles for *Sculpt 3-D*) for objects. QRT supports only four shape primitives: spheres, triangles, rings and parallelograms, although you can use quadratics to simulate other shapes.

QRT breaks white light into red, green and blue components to more easily deal with colors of objects. Because of this you can also have colored light sources. QRT supports reflection off of a back surface after the light ray has penetrated the front surface, (e.g., glass and other transparent or translucent materials). Just like DBWRender, QRT will allow you to generate only part of the image at one time. QRT supports a varied sky color (by asking for a horizon color and a zenith color and dithering the two). Patterns can be used on any surface with user-definable dimension in the form of a rectangle or a circle.

Check: by Keith Elbertson
(AmigaZone file #11644)

If you are sick of having your C compiler report dozens of errors every time you try to compile a program after a long programming session, here's a program that will allow you to check for certain mistakes before you send your code to the compiler. Check checks for proper control structures in C source code. If control errors are detected, then you can use certain parameters Check supports to check only for certain errors. Check will add line numbers to the text if you like and also supports inverse video mode.

BattleMech version 1.2: by Ralph Reed (AmigaZone file #11795; Shareware: $20)

This is an update to a complex robotic combat game with great audio/visual features that was originally reviewed in the April 1988 installment of this column. There have been many bugs fixes, plus many new features and improvements have been made. You can now aim fire towards forest hexes in order to set them ablaze. If you are knocked down you can now attempt to move via crawling. Each player has his own separate menu set. Any hit that penetrates the armor automatically damages the internal structure of a Mech. Damage for charging is now a function of speed instead of weight.

There are also a couple of corrections I'd like to make to my earlier review of BattleMech in the April issue. You can indeed run BattleMech from Workbench, *if* you have at least one megabyte of memory. (BattleMech just loves extra memory.) Also, the Factory program didn't work because Ralph disabled it for those who haven't paid the shareware fee (although he forgot to remove the program from the disk like he should have in the first place). The Factory program is no longer present on the shareware version of BattleMech. (The documentation for Factory is still there to give you a feel for the Factory program.)

Bformat: by Bob Bush

Would you like to be able to use floppy disks that the AmigaDOS FORMAT command won't format due to hard errors? Well BFormat might just save you a few dollars. Bformat will allow you to use most floppy disks that have hard errors by working around bad sectors. Bformat simply alters the block allocation map by declaring that these bad blocks are "in use," fooling AmigaDOS so that these blocks won't be touched. The only problem with Bformat is that you can't use the AmigaDOS DISKCOPY command to copy disks formatted with Bformat (you must use COPY instead).

Adventure: by Tom Culliton (AmigaZone file #11681)

This is an Amiga version of the classic adventure Colossal Cave by Crowther and Woods. (For those of you who have never heard of Colossal Cave, it was the first adventure game to appear on *any* computer system.) This is the basic 350-point version, although the author states that he will port over the 530- and 750-point versions as soon as he gets a decent source code for them.

MachII: by Brian Moats (AmigaZone file #11741)

This is version 2.1 of Mach, a "many utilities in one" utility program that I last reviewed in the May 1988 installment of this column (version 1.5). One of the new features is that Mach has been fixed to allow compatibility with *ProWrite* and *Snip-It.* There are now 20 hotkeys available instead of ten, and you can now define/edit a hotkey on the fly. There is also a command to assign instant screen blanking as part of any macro. The config file now supports various clock settings.

Menulink: by Stan Hodge (AmigaZone file #11855)

Would you like to be able to assign a menu set to your CLI window? Menulink will attach a menu set from another program that is currently running and attach it to the CLI's drag bar. The original program is not affected in any way, however, you must of course activate the CLI in order to use the duplicate menu set. The author warns that this program isn't very proper, and can be quite nasty to the system if maltreated.

PostCard: by Tim Holloway (AmigaZone file #11968; Shareware: $25)

This is a stripped-down version of Apple's popular HyperCard program. PostCard only works with single cards (i.e., PostCard doesn't support "stacks"). PostCard uses a non-HAM IFF picture as the card background, and text strings (with definable color, attributes and font type/size) as the gadgets. Actions for gadgets can include AmigaDOS commands (including parameters and redirection as needed). WARNING: when running PostCard my error handler (GOMF 2.0) reported that the program was attempting to trash the low area of system memory. Therefore, use this program *at your own risk.*

Scrivener: by Ken Howell (AmigaZone file #11660)

Scrivener is a combination between an input recorder program and a macro program. Scrivener will record up to 512 keyboard strokes, then save them as a macro for further use. Scrivener allows variables of either a fixed length or a variable length to be included inside the macro, which allows you to add user input during a playback of a macro.

All-Time Great Teams: by Patrick Mondout (Shareware: $9.50)

Here are many teams to be used with *Earl Weaver Baseball* from Electronic Arts. On this two-disk set are the complete set of teams from 1987, plus a whole set of great teams of the past, including the '27 Yankees, '47 Dodgers, '57 Braves, '69 Mets, '75 Red Sox and '85 Cardinals. Also on these disks are the All-Star teams for 1987, plus a team comprised of the top rookies of 1987.

For your amusement, there are two teams that contain various celebrities of 1987 (Boy, Donna Rice sure can run fast!). And finally there are two teams labeled "Winners!" and "Losers!" where the likes of such fictional stars as Korked Batt, Golden Arm, Wizard of Ozz, Kelvin Klubber and Round Tripper can beat up on the likes of Skid Rowe, Goafer Balls, Droug Rehab, Eddie Error and E. Five!

Also on this disk are a few dozen additional parks, including some that must have been designed by a very warped mind. There are a few mistakes with the "real" teams, however, (for example, Roger Clemens is a right-handed pitcher, not left-handed), and some pronunciations being wrong, but for those who have *Earl Weaver Baseball,* this is a cheap way to extend your enjoyment of a great game.

Next month, in addition to the normal set of reviews of the new Amiga PD programs obtained from PeopleLink, local BBS's and new Fish disks, I will be doing a special review of Moria, the latest fantasy role-playing game to come from the UNIX world to the Amiga.

I'd like to thank Patrick Mondout for sending me his shareware product for review consideration, and I'd also like to thank LCA Video & Computers in Norwood, MA for their help with this month's column.

As always, I can be reached on the AmigaZone on PeopleLink (ID: G KINSEY), or on the IDCMP BBS (617) 769-3172 (300/1200/2400 baud, running 24 hours a day), addressed to SYSOP.

If you have written a public domain/shareware/freely distributable program or have obtained one that you think is worth mentioning to all Amiga owners, then please attempt to contact me via the above, or through *Commodore Magazine.* See you next month.

To signup to PeopleLink and their AmigaZone, call them at:
(800) 524-0100 (voice)
(800) 826-8855 (via modem)

Adventure Road/New Graphic Adventures

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Wake Me Up When It's Over Department

Now let's look at a losing strategy: Infocomics, Tom Snyder's attempt at a non-interactive comic book on disk. The first one is *Lane Mastodon vs. the Blubbermen*, a science fiction spoof in which a superhero with a young sidekick and the sidekick's teen-aged sister, saves the world from an invasion of fat aliens from Jupiter.

Too bad Lane Mastodon didn't save us from this game, which put me to sleep after ten minutes of pressing (1) a key to fast-forward through the story, (2) another key to rewind, (3) a third key to save my place so I could resume "watching" later, and (4) the RETURN key, which enabled me to view the next part of the story from another character's perspective.

Problem was, no matter which character I viewed the story from I got bored watching a story in which I couldn't actively participate. The ability to interact with a fantasy—seeing the lake drained after I had solved the puzzle at the dam in *Zork I* was a mind-bending experience for me (and most people agree my mind is still bent)—and is the only thing that can keep me at the keyboard. A good story is one thing, but if all you can do is watch and read it, you might as well turn on the TV or pick up a book. So if you're hoping to find an adventure in Infocomics, don't count on it.

Even Infocom says these programs aren't intended for adventurers: they're supposed to attract a whole new audience, which is why they're being sold in comic book stores as well as software outlets. So I wasn't surprised or disappointed by Infocomics failure to entertain me. But do not confuse Infocomics with the upcoming illustrated adventures from the company, for these are entirely separate products that are based on different technologies.

Odds and Ends

Gauntlet: The Deeper Dungeons is a scenario disk that requires the program disk for the original 64 game. It is supposed to offer more than 500 dungeon levels—but who's counting?

Bard's Tale III should be out for the 64 by now. For the first time you can "use" objects: this leads to more emphasis on puzzles than in previous releases in the series.

Ultima V may also be available too. It takes place in the same world as *Ultima IV*—Brittania—and uses an identical map of the surface world. But you'll find an Underworld that's equally vast. The big difference is the introduction of time, which means each character in the towns and castles performs a regular schedule that depends on his craft or trade.

Electronic Arts is still promising *Star Flight* for the 64/128, but no date has been announced.

Clues of the Month

To reach the bottom of the Pirate's Lair in *Legacy of the Ancients,* keep turning left at each corner. If you hit a dead end, keep going the direction you were headed before turning. You'll arrive at the portal to the next level; do the same there. Take lots of healing herbs and spells. To reach the second level, use Magic Ice to freeze the water.

When you take things in *Wasteland,* they disappear from the scenario disk. But you can always make a second copy of the original. After finding a nice stash of weapons, cash or equipment in *Wasteland,* note its location, make another copy of the scenario disk it's on, and return to grab the same stuff and sell it or equip more party members with the valuable gear. It's cheating, I know—but this is war! ■

Inside Q-Link/Datacom Woes

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These problems are most likely to occur during heavy traffic periods on both Q-Link and its carriers. Joe's own experience indicated that the worst times to try to download are from 6:00 to 9:00 PM, Eastern Standard Time, especially on Friday and Saturday nights. Those are the hours when a new batch of subscribers in each time zone appear to be logging onto Q-Link, as well as other systems served by the networks. The best times to download appear to be during the day on Saturday and Sunday, plus early in the morning on weekdays.

Even under ideal network conditions, however, there's still one possible weak link—your local telephone service. Joe's phone company recently installed a new digital switching network and virtually all of the problems he previously encountered with Q-Link have vanished. If you know for a fact that your phone company's equipment is far from state-of-the-art, your best bet is to try calling at different times and noting the times when you have the fewest problems. Ancient phone equipment has its good times and bad times, and knowing this puts you ahead of the game.

One last hint from Joe is the fact that there is an area on Q-Link with *no* Plus Services. The Customer Service Center is an ideal place to "test the waters" before entering a Plus Area. If the system seems slow or erratic, go to the Customer Service Center and call up a couple of text files. See if the system seems to respond quickly. If things are going too slow, log off and try your call later. Sometimes just re-dialing the same input number will clear the problem.

One thing Joe didn't mention is the fact that many of the network input nodes have multiple input phone lines that respond to the same phone number. When your call comes in, the equipment automatically connects you to the next available line within the block of available numbers, even if you dialed the main number. Sometimes one of these lines may have a problem, and re-dialing back into the node may select another input line and avoid the problem.

By the way, while you're in the Customer Service Center you can tell Q-Link about your download problem. Q-Link *will* give you a credit for incomplete downloads, providing the problem isn't caused by call waiting or other special services that insert a tone into the phone line during a connection. *Never* attempt a second download on the same call in which the problem occurred. Instead, report the problem to Q-Link via the Customer Service Center. Then, log off, wait a while, and try again.

If you have been experiencing difficulties downloading a particular file, post a comment when the file *does* finally download correctly. You don't *really* think the guy who uploaded the file is a jerk, do you?

Well, my thanks to Joe for his helpful comments and thoughts this month. As I've mentioned in previous columns, your comments and input are always welcome. If you want to contribute anything to this column, just let me know. I can be reached almost daily by E-Mail to RBAKER; please try E-Mail first instead of online messages. I'm not always free to respond to online messages in a timely fashion, but I will get back to you when I can.

By the way, a few users have mentioned that they prefer the MVIEW utility by Wombat to the ULTRA sequential file reader utility that I've mentioned previously. You might want to check it out in the download libraries. ■

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Learning to program the User Port is like learning to ride a bicycle—a challenge for the learner, but very well worth mastering. To *really* understand it, you have to get in-depth knowledge of peeks, pokes, binary and hexadecimal. That isn't very much to learn, but for most of us it's knowledge of a new and different kind, so it *seems* to be very difficult. But once your decimal-trained brain has learned to think in binary, you'll be amazed how simple it is.

And when your first construction project actually *works*, you'll learn the feeling of pride in accomplishment.
Louis F. Sander
Pittsburgh, PA

***geoPaint* Linearity Tip:** Since this drawing program's screen output is longer vertically than its printer output, drawings become squashed on the printout.

One way to fix this is by adjusting the vertical height on your monitor until the screen picture matches the printout. But what if, like myself, you use a TV set for a monitor?

A solution can be found in the X and Y measures at the bottom of the screen. When they are equal, you have a square. Draw one and use it as a model. Since it won't look square on the screen, try to squash everything else to match it. Even if you don't squash perfectly, your printed output will be closer to what you see on the screen.
Juan Rodriguez
Abington, PA

Speeding up GEOS: This popular program works very slowly with only one disk drive. Adding a second drive gives a big improvement in speed. Adding a RAM expander also speeds things up; my new 1764 was a very worthwhile investment.
Lucy S. Terrier
Alton, IL

128 80-column line space changer: This line of code, executable in direct or program mode, makes an interesting change to the 128's 80-column display. When it is executed, the characters shrink to half their normal height, with the missing height showing up as space between the lines.

The modified display looks great, so I always execute this line before booting up my word processor.

Pressing the STOP/RESTORE combination will return the characters to their normal size.
Allen S. Cheung
Clairton, PA

```
10 REM 128 80-COLUMN LINE SPACE
   CHANGER
20 BANK 15:POKE 54784,8:POKE 54785,3
   :POKE 54784,9:POKE 54785,15
   :POKE 54784,23:POKE 54785,15
```

GEOS 128 Shortcut: This program includes many improvements that are not available in the 64 version. One that you can use very frequently involves the all too familiar OK prompt.

The OK prompt appears when GEOS 128 asks you to confirm an error such as Missing Disk, as well as when it asks you if you are sure you want it to execute a certain command.

When you get the OK prompt, you do *not* have to drag the mouse or joystick over to the prompt to signify "OK." Just hit the RETURN key instead.
Brendan Schulman
Winnipeg, Manitoba
Canada

64 Machine Language Saver: The accompanying program can be used to save any area of memory to disk. You may find it useful in saving the machine language generated by the three programs that follow.

To use the ML Saver, put your machine language, sprite, or whatever into memory and note its starting and ending addresses. Choose a filename under which to save it, then run this program.

When you respond to the prompts for filename, start address and end address, the indicated area of memory will be saved from the start address to end address inclusive.

If the disk contains another file with the same filename, that file will be scratched before the new one is saved. With this feature, you can save your updates as you make them, without having to give them unique filenames.
Michael J. Gibbons
Orange City, FL

```
100 PRINT"[CLEAR]64 MACHINE LANGUAGE
    SAVER - MIKE GIBBONS"
110 D=8 :REM DRIVE NUMBER
120 PRINT"SAVE W/REPLACE ANY SECTION
    OF MEMORY[DOWN]"
130 INPUT"[SPACE5]FILENAME";F$
    :INPUT"START ADDRESS";A1
    :INPUT"[SPACE2]END ADDRESS";A2
140 OPEN 15,8,15,"S0:"+F$:CLOSE 15
150 A$=F$:L=PEEK(53)+256*PEEK(54)-LEN
    (A$):POKE 782,L/256
160 POKE 781,L-PEEK(782)*256
    :POKE 780,LEN(A$):SYS 65469
170 POKE 780,1:POKE 781,D:POKE 782,1
    :SYS 65466
180 T=A1:POKE 254,T/256
    :POKE 253,T-PEEK(254)*256
    :POKE 780,253
190 T=A2+1:POKE 782,T/256
    :POKE 781,T-PEEK(782)*256
    :SYS 65496
200 S$=" ":OPEN 15,8,15
    :INPUT#15,A,B$,C$,D$:CLOSE 15
    :PRINT"[DOWN]";A;B$;S$;C$;S$;D$
```

64 Search Utility: When writing long programs, you can spend an inordinate amount of time sifting through listings to find certain variables or subroutine calls. The accompanying program can be used to locate any desired variable, string or BASIC keyword in a 64 BASIC program.

Each line containing the searched-for item will be displayed on the screen and can be redirected to the printer via the CMD command.

To use the utility, just run the attached program. Then load the BASIC program you want to search through, and enter the search command in the following format:

SYS 49152,*searchitem*

The *searchitem* can be anything at all in the program, and

BASIC commands may be abbreviated if you'd like. Don't use parentheses unless you want to search for them.

The utility's usefulness becomes apparent when you are working with a long program. For example, I was recently working with a 1,056-line program, and I had to change the starting line number of a subroutine. Without this utility, I would have had to sift through every one of the 1,055 other lines to find where calls to this subroutine were made. Instead, I just used the search command with the subroutine's old line number as *searchitem*.

Using the utility is easier if you save the machine language directly, then reload it whenever it's needed. Its start address is 49152, and its end address is 49354.

Michael J. Gibbons
Orange City, FL

```
10 PRINT"[CLEAR]64 SEARCH - MICHAEL
   GIBBONS"
20 PRINT"[DOWN]WORKING..."
   :FOR J=1 TO 203:READ K
   :POKE 49151+J,K:CS=CS+K:NEXT
30 IF CS<>30072 THEN PRINT"ERROR IN
   DATA STATEMENTS!":STOP
40 PRINT"[UP]TO SEARCH FOR XXX,
    ENTER SYS49152,XXX"
41 DATA 160,000,200,177,122,153,205,
   192
42 DATA 208,248,160,000,152,153,000,
   002
43 DATA 200,192,080,208,248,169,008,
   133
44 DATA 252,169,001,133,251,160,002,
   177
45 DATA 251,141,203,192,200,177,251,
   141
46 DATA 204,192,200,177,251,240,027,
   205
47 DATA 206,192,208,246,140,205,192,
   162
48 DATA 000,232,200,189,206,192,240,
   028
49 DATA 209,251,240,245,172,205,192,
   076
50 DATA 042,192,200,024,152,101,251,
   133
51 DATA 251,144,002,230,252,160,001,
   177
52 DATA 251,208,194,096,173,203,192,
   133
53 DATA 020,173,204,192,133,021,032,
   019
54 DATA 166,160,001,132,015,032,215,
   170
55 DATA 160,003,132,073,173,204,192,
   174
56 DATA 203,192,032,205,189,169,032,
   164
57 DATA 073,041,127,032,071,171,201,
   034
58 DATA 208,006,165,015,073,255,133,
   015
59 DATA 200,240,004,177,095,208,011,
   165
60 DATA 096,133,252,165,095,133,251,
   076
61 DATA 074,192,016,223,201,255,240,
   219
62 DATA 036,015,048,215,056,233,127,
   170
63 DATA 132,073,160,255,202,240,008,
   200
64 DATA 185,158,160,016,250,048,245,
   200
65 DATA 185,158,160,048,186,032,071,
   171
66 DATA 208,245,096
```

64 BASIC Linker Utility: The ability for one BASIC program to load and run another can be very useful, but it can be somewhat tricky to do. If you merely use the LOAD command from within a program, you can easily get into trouble.

First of all, a program mode LOAD does *not* initialize the variables of the loaded program. Any variable that was used in the first program will retain its value when the second program starts running. Since many programs *rely* on all variables being zeroed when a run is started, many troubles can result.

Connected with retaining the value of the variables is the requirement that the loading program is longer than the loaded one. If this requirement is ignored, the loaded program will corrupt itself and fail to run properly.

The accompanying program creates a machine language routine that allows one BASIC program to load and run another, without having to worry about variable values or program lengths.

After the machine language is poked into memory, your BASIC program can load and run another BASIC program by executing a statement of the form

SYS 49152,"*programname*",8

That's all there is to it. Just don't forget to include the drive number at the end—if you want the program to load from another drive, substitute its number for the 8 shown in the example.

The machine language is totally relocatable, so if you want to put it at a different starting address, just change the value of SA in line 30. Also, you may want to save the machine language itself, to avoid having to poke it into memory every time you use it. With the starting address as shown, it occupies memory from 49152 – 49208.

Michael J. Gibbons
Orange City, FL

```
10 PRINT"[CLEAR]64 LINKER - MICHAEL
   GIBBONS"
20 :
30 SA=49152:REM RELOCATABLE START ADDR
40 :
50 PRINT "[DOWN2]WORKING..."
   :FOR J=0 TO 56:READ K:POKE SA+J,K
   :CS=CS+K:NEXT
60 IF CS<>6644 THEN PRINT"ERROR IN
   DATA STATEMENTS!":STOP
70 C$="[LEFT],":Q$=CHR$(34)
   :PRINT"[UP]TO HAVE ONE BASIC
   PROGRAM LOAD ANOTHER,"
80 PRINT:PRINT"EXECUTE SYS";SA;C$;Q$;
   "PROGRAMNAME";Q$;",DRIVE#[DOWN2]"
```

```
81 DATA 032,253,174,169,000,133,010,
   032
82 DATA 212,225,165,010,166,043,164,
   044
83 DATA 032,213,255,176,033,032,066,
   166
84 DATA 032,183,255,041,191,240,005,
   162
85 DATA 029,076,055,164,134,045,134,
   047
86 DATA 132,046,132,048,169,000,032,
   144
87 DATA 255,104,104,076,089,166,076,
   249
88 DATA 224
```

64 Machine Language Loader Utility: Connected with the problem of having a BASIC program load another BASIC program is the problem of having a BASIC program load machine language.

Instead of using the usual cumbersome code, you might want to use the accompanying program.

After its machine language is poked into memory, the following statement can be used anywhere in a BASIC program to load a machine language file:

SYS 820,"*filename*"

Notice that you don't include the drive number.

What we've called "machine language" can, of course, be *anything* that fills a specific range of memory—a sprite, a group of sprites, a hi-res screen, and so forth.

The machine language from *our* program is completely relocatable, so if you want it to reside in another area of memory, change the value of SA in line 30.

As with the programs above, you may want to save this one's machine language by itself to save having to poke it into memory every time you want to use it.

Michael J. Gibbons
Orange City, FL

```
10 PRINT"[CLEAR]64 ML LOADER-MICHAEL
   GIBBONS"
20 :
30 SA=820:REM RELOCATABLE START
   ADDRESS
40 :
50 PRINT "[DOWN2]WORKING..."
   :FOR J=0 TO 34:READ K:POKE SA+J,K
   :CS=CS+K:NEXT
60 IF CS<>4298 THEN PRINT"ERROR IN
   DATA STATEMENTS!":STOP
70 C$="[LEFT],":Q$=CHR$(34)
   :PRINT"[UP]TO HAVE A BASIC PROGRAM
   LOAD ML,"
80 PRINT:PRINT"EXECUTE SYS";SA;C$;Q$;
   "MLFILENAME";Q$;"[DOWN2]"
81 DATA 032,253,174,169,001,162,008,
   168
82 DATA 032,186,255,032,158,173,169,
   013
83 DATA 208,005,162,022,076,055,164,
   032
84 DATA 166,182,032,189,255,169,000,
   032
85 DATA 213,255,096
```

Okimate Head Cleaning: I tried several different chemicals to clean the print head on my Okimate 10, and I found the best by far to be a Kodak product for cleaning photographic film.

Kodak Film Cleaner #195-6986 leaves the printhead super clean and residue free. Be sure to heed the warnings on bottle!

Perry Wilson
Des Moines, IA

Cheap Printer Labels: Have a printer? Have a label-printing program, but no pre-made stick-on labels? If you don't need too many labels, you can print them on regular paper, cut them out and use a glue stick to attach them wherever they are to go.

If you're not up to the 1980's adhesive technology embodied in the glue stick, Elmer's Glue will work almost as well.

Shane D. Dolha
Regina, Saskatchewan
Canada

Dongle Dilemma Dehorned: *PaperClip 64/128*'s dongle does not plug into the intended Port 1 of the 128, due to the sculptured side of the machine. *PaperClip II* corrected the problem by having its dongle plug into Port 2. Unfortunately, this alienates all *PaperClip64* processed files!

Even in Port 2, the dongle fits poorly and sometimes drops out because it protrudes like a sore thumb from the side of the 128.

The solution for all dongles is to make a joystick cord extension, or more simply, to buy a joystick extension cord (Radio Shack #270-1705, available for $4.99 in the 1988 catalog). Plug it into the appropriate port, route the extension along the existing power supply cord, and let the dongle dangle out of sight.

Edmund G daSilva
Rio de Janiero, Brazil

1351 Mouse in Joystick Mode: It isn't mentioned in the user's guide, but you can select the joystick mode after powering up the computer. Just hold down the right button as you plug the mouse into the port. This is *very* useful if you have loaded your program but installed the mouse in the wrong port or didn't install it at all. It saves you having to re-power the computer and re-boot the program.

Juan Rodriguez
Abington, PA

RAM Expander RAMDOS: If you have a RAM expansion unit for your 128, be certain you have the RAMDOS program, which allows you to use your expander as a very fast disk drive. Many early RAM expander units were shipped without this valuable program, which is now available on Q-Link and in many user group libraries.

Luke A. Babey
Port Washington, NY

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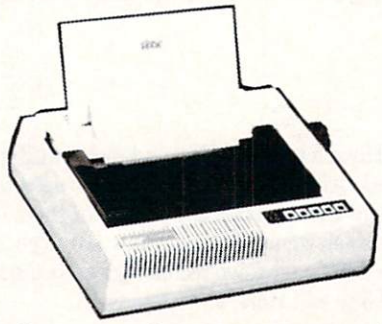
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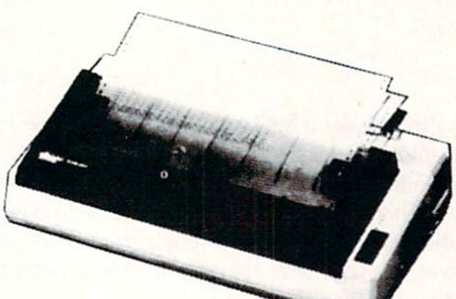
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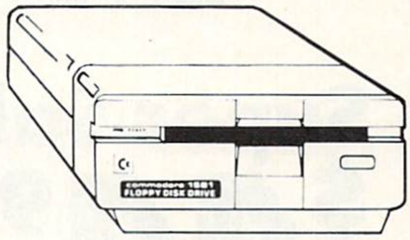
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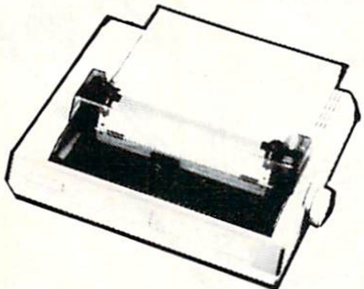
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VISA — MASTERCARD — C.O.D.

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN, RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice. Note: Do not enter the commas.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

- "[HOME]" = UNSHIFTED CLR/ HOME
- "[CLEAR]" = SHIFTED CLR/HOME
- "[DOWN]" = CURSOR DOWN
- "[UP]" = CURSOR UP
- "[RIGHT]" = CURSOR RIGHT
- "[LEFT]" = CURSOR LEFT
- "[RVS]" = CONTROL 9
- "[RVOFF]" = CONTROL 0
- "[BLACK]" = CONTROL 1
- "[WHITE]" = CONTROL 2
- "[RED]" = CONTROL 3
- "[CYAN]" = CONTROL 4
- "[PURPLE]" = CONTROL 5
- "[GREEN]" = CONTROL 6
- "[BLUE]" = CONTROL 7
- "[YELLOW]" = CONTROL 8
- "[ORANGE]" = COMMODORE 1
- "[BROWN]" = COMMODORE 2
- "[L. RED]" = COMMODORE 3
- "[GRAY1]" = COMMODORE 4
- "[GRAY2]" = COMMODORE 5
- "[L. GREEN]" = COMMODORE 6
- "[L. BLUE]" = COMMODORE 7
- "[GRAY3]" = COMMODORE 8
- "[F1]" = F1
- "[F2]" = F2
- "[F3]" = F3
- "[F4]" = F4
- "[F5]" = F5
- "[F6]" = F6
- "[F7]" = F7
- "[F8]" = F8
- "[POUND]" = ENGLISH POUND
- "[SHFT ^]" = PI SYMBOL
- "[^]" = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY ("[SHFT Q,SHFT J,SHFT D,SHFT S]") OR THE LETTERS CMDR (COMMODORE) AND A KEY ("[CMDR Q,CMDR G,COMDR Y,CMDR H]"). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA ("[SPACE3,SHFT S4,CMDR M2]").

SYNTAX ERROR

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message "?Syntax Error Break In Line 270", type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parenthesis. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the "wrong" line to look at. If the line the syntax error refers to has a function call (i.e., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

ILLEGAL QUANTITY ERROR

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

OUT OF DATA ERROR

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

OTHER PROBLEMS

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than 80 (or 88) characters on one line. You can enter these lines by abbreviating the commands when you enter the line. The abbreviations for BASIC commands are on pages 133-134 of the VIC 20 user guide and 130-131 of the Commodore 64 user's guide.

If you type a line that is longer than 80 (or 88) characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed (without a line number). Many people write that the computer gives them a syntax error when they type the line, or that the computer refuses to accept a line. Both of these problems are results of typing a line of more than 80 (or 88) characters.

THE PROGRAM WON'T RUN!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is "running". Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

IF ALL ELSE FAILS

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program. The user group may also have the program on a library disk and be willing to make a copy for you.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase you understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

All of this information is helpful in answering your questions about why a program doesn't work. A letter that simply states "I get an error in line 250 whenever I run the program" doesn't give us much to go on. Send your questions to:

Commodore Magazine
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

Have fun with the programs!

HOW TO USE THE MAGAZINE ENTRY PROGRAMS

The Magazine Entry Programs on the next pages are two BASIC machine language programs that will assist you in entering the programs in this magazine correctly. There are versions for both the Commodore 64 and the Commodore 128. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 49900 (4864-5545 on the 128) and just lets you know that the program is running. If everything is ok, the program will finish running and say DONE. Then type NEW. If there is a problem with the data statements, the program will tell you where to find the problem. Otherwise the program will say "mistake in data statements." Check to see if commas are missing, or if you have used periods instead of commas. Also check the individual data items.

Once the program has run, it is in memory ready to go. To activate the program type SYS49152 (SYS4864 on the 128), and press RETURN. You are now ready to enter the programs from the magazine. To disable the Entry Program, just type KILL [RETURN] on the 64 or SYS4867 on the 128.

The checksums for each line are the same for both the 64 and 128, so you can enter your 64 programs on the 128 if you'd like.

Typing the Programs

All the BASIC program listings in this magazine that are for the 64 or 128 have an apostrophe followed by four letters at the end of the line (e.g., 'ACDF). If you plan to use the Magazine Entry Program to enter your programs, the apostrophe and letters **should** be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it **does not** enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are five error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT . .) incorrectly. Check the line in the magazine again and check your spelling.

OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake.

The Magazine Entry Programs are available on disk, along with other programs in this magazine, for $9.95. To order, contact Loadstar at 1-800-831-2694.

```
10 PRINT"[CLEAR]POKING -";
20 P=49152 :REM $C000  (END AT
   49900/$C2EC)
30 READ A$:IF A$="END"THEN 110
40 L=ASC(MID$(A$,2,1))
50 H=ASC(MID$(A$,1,1))
60 L=L-48:IF L>9 THEN L=L-7
70 H=H-48:IF H>9 THEN H=H-7
80 PRINT"[HOME,RIGHT12]"P;
90 IF H>15 OR L>15 THEN PRINT
   :PRINT"DATA ERROR IN LINE";
   1000+INT((P-49152)/8):STOP
100 B=H*16+L:POKE P,B:T=T+B:P=P+1
    :GOTO 30
110 IF T<>86200 THEN PRINT
    :PRINT"MISTAKE IN DATA --> CHECK
    DATA STATEMENTS":END
120 PRINT"DONE":END
1000 DATA 4C,1F,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,0D,00,21
1002 DATA C1,27,C1,2F,C1,3F,C1,4C
1003 DATA C1,EA,EA,EA,4C,54,C0,A2
1004 DATA 05,BD,19,C0,95,73,CA,10
1005 DATA F8,60,60,A0,03,B9,00,02
1006 DATA D9,04,C1,D0,F5,88,10,F5
1007 DATA A0,05,B9,A2,E3,99,73,00
1008 DATA 88,10,F7,A9,00,8D,18,D4
1009 DATA 4C,EF,C0,E6,7A,D0,02,E6
1010 DATA 7B,4C,79,00,A5,9D,F0,F3
1011 DATA A5,7A,C9,FF,D0,ED,A5,7B
1012 DATA C9,01,D0,E7,20,2B,C0,AD
1013 DATA 00,02,20,74,C0,90,DC,A0
1014 DATA 00,4C,A9,C1,C9,30,30,06
1015 DATA C9,3A,10,02,38,60,18,60
1016 DATA C8,B1,7A,C9,20,D0,03,C8
1017 DATA D0,F7,B1,7A,60,18,C8,B1
1018 DATA 7A,F0,37,C9,22,F0,F5,6D
1019 DATA 03,C0,8D,03,C0,AD,04,C0
1020 DATA 69,00,8D,04,C0,4C,8E,C0
1021 DATA 18,6D,05,C0,8D,05,C0,90
1022 DATA 03,EE,06,C0,EE,09,C0,4C
1023 DATA CE,C1,18,6D,08,C0,8D,08
1024 DATA C0,90,03,EE,07,C0,EE,0A
1025 DATA C0,60,0A,A8,B9,0F,C0,85
1026 DATA FB,B9,10,C0,85,FC,A0,00
1027 DATA A9,12,20,D2,FF,B1,FB,F0
1028 DATA 06,20,D2,FF,C8,D0,F6,20
1029 DATA BC,C2,20,E4,FF,F0,FB,A0
1030 DATA 18,B9,08,C1,20,D2,FF,88
1031 DATA 10,F7,68,68,A9,00,8D,00
1032 DATA 02,4C,74,A4,4B,49,4C,4C
1033 DATA 91,91,0D,20,20,20,20,20
1034 DATA 20,20,20,20,20,20,20,20
1035 DATA 20,20,20,20,20,20,20,91
1036 DATA 0D,51,55,4F,54,45,00,4B
1037 DATA 45,59,57,4F,52,44,00,23
1038 DATA 20,4F,46,20,43,48,41,52
1039 DATA 41,43,54,45,52,53,00,55
1040 DATA 4E,49,44,45,4E,54,49,46
1041 DATA 49,45,44,00,4E,4F,20,43
1042 DATA 48,45,43,4B,53,55,4D,00
1043 DATA C8,B1,7A,D0,FB,84,FD,C0
1044 DATA 09,10,03,4C,84,C1,88,88
1045 DATA 88,88,88,B1,7A,C9,27,D0
1046 DATA 13,A9,00,91,7A,C8,A2,00
1047 DATA B1,7A,9D,3C,03,C8,E8,E0
1048 DATA 04,D0,F5,60,A9,04,4C,CA
1049 DATA C0,A0,00,B9,00,02,99,40
1050 DATA 03,F0,F0,C8,D0,F5,A0,00
1051 DATA B9,40,03,F0,E6,99,00,02
1052 DATA C8,D0,F5,20,96,C1,4C,12
1053 DATA C2,A0,09,A9,00,99,03,C0
1054 DATA 8D,3C,03,88,10,F7,A9,80
1055 DATA 85,02,A0,00,20,58,C1,20
1056 DATA 89,C1,20,ED,C1,E6,7A,E6
1057 DATA 7B,20,7C,A5,A0,00,20,80
1058 DATA C0,F0,D0,24,02,F0,06,4C
1059 DATA A8,C0,4C,CE,C1,C9,22,D0
1060 DATA 06,20,8D,C0,4C,CE,C1,20
1061 DATA BA,C0,4C,CE,C1,A0,00,B9
1062 DATA 00,02,20,74,C0,C8,90,0A
1063 DATA 18,6D,07,C0,8D,07,C0,4C
1064 DATA EF,C1,88,A2,00,B9,00,02
1065 DATA 9D,00,02,F0,04,E8,C8,D0
1066 DATA F4,60,18,AD,09,C0,69,41
1067 DATA 8D,09,C0,38,AD,0A,C0,E9
1068 DATA 19,90,06,8D,0A,C0,4C,1C
1069 DATA C2,AD,0A,C0,69,41,8D,0A
1070 DATA C0,AD,03,C0,6D,05,C0,48
1071 DATA AD,04,C0,6D,06,C0,8D,0C
1072 DATA C0,68,6D,08,C0,8D,0B,C0
1073 DATA AD,0C,C0,6D,07,C0,8D,0C
1074 DATA C0,38,E9,19,90,06,8D,0C
1075 DATA C0,4C,52,C2,AD,0C,C0,69
1076 DATA 41,8D,0C,C0,AD,0B,C0,E9
1077 DATA 19,90,06,8D,0B,C0,4C,67
1078 DATA C2,AD,0B,C0,69,41,8D,0B
1079 DATA C0,A0,01,AD,09,C0,CD,3C
1080 DATA 03,D0,20,C8,AD,0A,C0,CD
1081 DATA 3D,03,D0,17,C8,AD,0B,C0
1082 DATA CD,3E,03,D0,0E,AD,0C,C0
1083 DATA CD,3F,03,D0,06,20,CC,C2
1084 DATA 4C,4B,C0,98,48,68,4C,CA
1085 DATA C0,A9,20,8D,00,D4,8D,01
1086 DATA D4,A9,09,8D,05,D4,A9,0F
1087 DATA 8D,18,D4,60,20,A9,C2,A9
1088 DATA 81,20,DF,C2,A9,80,20,DF
1089 DATA C2,4C,D9,C2,20,A9,C2,A9
1090 DATA 11,20,DF,C2,A9,10,20,DF
1091 DATA C2,A9,00,8D,04,D4,60,8D
1092 DATA 04,D4,A2,70,A0,00,88,D0
1093 DATA FD,CA,D0,FA,60,END
```

END

```
5 TRAP 200
10 PRINT"[CLEAR]POKING -";
20 P=4864 :REM $1300  (END AT
   5545/$15A9)
30 READ A$:IF A$="END"THEN 110
80 PRINT"[HOME,RIGHT12]"P;
100 B=DEC(A$):POKE P,B:T=T+B:P=P+1
   :GOTO 30
110 IF T<>59382 THEN PRINT
   :PRINT"MISTAKE IN DATA --> CHECK
   DATA STATEMENTS":END
120 PRINT"DONE":END
200 PRINT:PRINT"DATA ERROR IN LINE";
   1000+INT((P-4864)/8):END
1000 DATA 4C,1E,13,4C,3A,13,00,00
1001 DATA 8E,00,F7,00,42,41,51,57
1002 DATA 0D,00,0D,43,08,14,0E,14
1003 DATA 16,14,26,14,33,14,A9,00
1004 DATA 8D,00,FF,AD,04,03,8D,12
1005 DATA 13,AD,05,03,8D,13,13,A2
1006 DATA 4A,A0,13,8E,04,03,8C,05
1007 DATA 03,60,AD,12,13,8D,04,03
1008 DATA AD,13,13,8D,05,03,60,6C
1009 DATA 12,13,A5,7F,D0,F9,AD,00
1010 DATA 02,20,5B,13,90,F1,A0,00
1011 DATA 4C,6F,14,C9,30,30,06,C9
1012 DATA 3A,10,02,38,60,18,60,C8
1013 DATA B1,3D,C9,20,D0,03,C8,D0
1014 DATA F7,B1,3D,60,18,C8,B1,3D
1015 DATA F0,35,C9,22,F0,F5,6D,06
1016 DATA 13,8D,06,13,AD,07,13,69
1017 DATA 00,8D,07,13,4C,75,13,18
1018 DATA 6D,08,13,8D,08,13,90,03
1019 DATA EE,09,13,EE,0C,13,60,18
1020 DATA 6D,0B,13,8D,0B,13,90,03
1021 DATA EE,0A,13,EE,0D,13,60,0A
1022 DATA A8,B9,14,13,85,FB,B9,15
1023 DATA 13,85,FC,A0,00,8C,00,FF
1024 DATA A9,12,20,D2,FF,B1,FB,F0
1025 DATA 06,20,D2,FF,C8,D0,F6,20
1026 DATA 79,15,20,A3,15,20,E4,FF
1027 DATA F0,FB,A0,1B,B9,EF,13,20
1028 DATA D2,FF,88,10,F7,68,68,A9
1029 DATA 00,8D,00,02,4C,B7,4D,91
1030 DATA 91,0D,20,20,20,20,20,20
1031 DATA 20,20,20,20,20,20,20,20
1032 DATA 20,20,20,20,20,20,91,0D
1033 DATA 51,55,4F,54,45,00,4B,45
1034 DATA 59,57,4F,52,44,00,23,20
1035 DATA 4F,46,20,43,48,41,52,41
1036 DATA 43,54,45,52,53,00,55,4E
1037 DATA 49,44,45,4E,54,49,46,49
1038 DATA 45,44,00,4E,4F,20,43,48
1039 DATA 45,43,4B,53,55,4D,00,C8
1040 DATA B1,3D,D0,FB,98,30,04,C9
1041 DATA 06,30,1E,88,88,88,88,88
1042 DATA B1,3D,C9,27,D0,13,A9,00
1043 DATA 91,3D,C8,A2,00,B1,3D,9D
1044 DATA 00,0B,C8,E8,E0,04,D0,F5
1045 DATA 60,4C,5C,15,4C,C5,14,A0
1046 DATA 09,A9,00,99,06,13,8D,00
1047 DATA 0B,88,10,F7,A9,80,85,FD
1048 DATA A0,00,20,3F,14,20,AE,14
1049 DATA 20,0D,43,84,FA,A0,FF,20
1050 DATA 67,13,F0,D8,24,FD,F0,06
1051 DATA 20,8F,13,4C,8F,14,C9,22
1052 DATA D0,06,20,74,13,4C,8F,14
1053 DATA 20,9F,13,4C,8F,14,A0,00
1054 DATA B9,00,02,20,5B,13,C8,90
1055 DATA 0A,18,6D,0A,13,8D,0A,13
1056 DATA 4C,B0,14,88,60,18,AD,0C
1057 DATA 13,69,41,8D,0C,13,38,AD
1058 DATA 0D,13,E9,19,90,06,8D,0D
1059 DATA 13,4C,CF,14,AD,0D,13,69
1060 DATA 41,8D,0D,13,AD,06,13,6D
1061 DATA 08,13,48,AD,07,13,6D,09
1062 DATA 13,8D,0F,13,68,6D,0B,13
1063 DATA 8D,0E,13,AD,0F,13,6D,0A
1064 DATA 13,8D,0F,13,38,E9,19,90
1065 DATA 06,8D,0F,13,4C,05,15,AD
1066 DATA 0F,13,69,41,8D,0F,13,AD
1067 DATA 0E,13,E9,19,90,06,8D,0E
1068 DATA 13,4C,1A,15,AD,0E,13,69
1069 DATA 41,8D,0E,13,A0,01,AD,0C
1070 DATA 13,CD,00,0B,D0,20,C8,AD
1071 DATA 0D,13,CD,01,0B,D0,17,C8
1072 DATA AD,0E,13,CD,02,0B,D0,0E
1073 DATA AD,0F,13,CD,03,0B,D0,06
1074 DATA 20,89,15,A4,FA,60,98,48
1075 DATA 68,4C,AF,13,A9,04,4C,AF
1076 DATA 13,A9,00,8D,00,FF,A9,20
1077 DATA 8D,00,D4,8D,01,D4,A9,09
1078 DATA 8D,05,D4,A9,0F,8D,18,D4
1079 DATA 60,20,61,15,A9,81,20,9C
1080 DATA 15,A9,80,20,9C,15,4C,96
1081 DATA 15,20,61,15,A9,11,20,9C
1082 DATA 15,A9,10,20,9C,15,A9,00
1083 DATA 8D,04,D4,60,8D,04,D4,A2
1084 DATA 70,A0,00,88,D0,FD,CA,D0
1085 DATA FA,60,END
```

END

Continued from page 18

California Games: In BMX, you may achieve your top speed by pushing right while tapping the button vigorously. It will be a lot easier on your hands.
Jeffrey Wong
Address Unknown

California Games: In the Flying Disk event, if you go too long without throwing your Frisbee™, a flying saucer will come down and pick up your partner, resulting in a lost turn. So throw your Frisbee quickly unless you want to see a reject from *Galaxian.*
Brett Meyer
Rota, Spain

California Games: When playing Footbag, it's faster to move left to right when your man is facing toward you rather than away. To get maximum speed, do your stunts, then when the bag starts coming down, quickly face forward.
Contributor Unknown

California Games: During the Roller Skating event, you normally move the joystick up and down to move. If you press the SHIFT LOCK key, you will move automatically and will only have to worry about pressing the button. While doing this, be sure you don't move the joystick up, or the skater will go off the screen.
Matthew Wolfe
Waldwick, NJ

California Games: On the Surfing event, use as much of the wave as you can. To do an aerial, get in front of the wave so that you cannot see any white water, then push the joystick left until your board faces in a vertical up position. Go off the lip of the wave, and as soon as you're in the air, press the joystick right until you straighten back into the vertical down position. If you have a lot of speed, this will work and earn you a lot of points.
Jason Zada
Honolulu, HI

Choplifter: To avoid attack by enemy planes, wait until a plane enters the screen, then move your chopper away from it. This tip is particularly useful for trips back to base with a full load of men.
Alex Fagundes
Ames, IA

Chuck Yeager's Advanced Flight Trainer: When you load the game up, select Demo Mode. Then watch the game until an interesting part comes up. Press the fire button and take over.
Sherrod Allen
Address Unknown

Crimson Crown: To beat the Vampire, get the crown and have Erik wear it. The Vampire's stare will be neutralized if Sabrina touches him while he's wearing it. Run back to the beach where you found the shell, and wait for the ships to come and get you.
John McDaniel
Norfolk, VA

Demon Stalkers: If you're having trouble with a particular level, or if you think it would be fun to preview unplayed levels, this procedure might help.

First load *Demon Stalkers,* then enter the Dungeon Construction mode. Once in this editing mode, set the level that you wish to preview. Insert your scenario disk and load the level.

Unfortunately for those who are curious about the upper levels, this doesn't work with levels 100 and 101.
Myron Brown
Craigsville, WV

Flight Simulator I and II: To improve on your landings, enter the Editor by pressing "E" and type in these coordinates:

North Position — 17191
East Position — 16671
Altitude — 673
Heading — 179
Airspeed — 108
Throttle — 0

You will be lined up on a landing approach at Meigs Field. I really improved my landings this way!
Matthew Weidner
Address Unknown

4th & Inches: When playing against the computer, try this: Select Shotgun With Back, Out, Medium Pass and either Wide Receiver. When play begins, your receiver will go out six yards from the line of scrimmage and cut to the sidelines. The play usually nets about seven yards, but there are times when the receiver busts loose for a long one.
Victor R. Heredia
El Paso, TX

4th & Inches: With time running out in the game, the computer opponent would rather try a field goal than try to score a touchdown. It does this if it is trailing, no matter by how much. After the field goal, it always tries an onside kick. If it recovers the onside kick, it tries another field goal.
Victor R. Heredia
El Paso, TX

Gauntlet: Many people are frustrated with this game because it isn't "saveable" as you move through the mazes. If you want to get up towards Level 200 instead of Level 60 or 70 then plug two joysticks into your computer. Choose the two-player option and choose the characters you prefer (I like Thor and Merlin). Pick one of them to use first. When instructed to press the fire button, only press it on your chosen character. When his health points get down around 10, switch to the second character, letting the first one "die." Repeat this procedure until you're tired or have completed level 999 (yeah right!).
Contributor Unknown

Ghostbusters: When there are a lot of yellow ghosts coming from the corners of the screen, take the marker and cover all the areas where the yellow ghosts are. When you go to your destination, you will get all the yellow ghosts.
Thomas Uber
Address Unknown

Gunship: If you've never gotten any medal besides the National Defense Service Medal, the Air Medal and Campaign Ribbons, remember your CO likes you to complete your missions quickly. Try finishing your mission in five to 15 minutes.

When your mission requires you to do anything in the vicinity of a grid point, remember that your targets are colored in light red.

Your best chance for getting a medal is in Volunteer or Volunteer For Hazardous Duty. If you perform volunteer missions, you can probably get at least the Army Commendation Medal, but I can't guarantee the Congressional Medal of Honor!
Mike Johns
South Euclid, OH

Gunship: When you have been shot down and killed or become MIA, turn off the computer right away. This prevents you from being recorded as KIA (Killed In Action) or MIA (Missing in Action). This works with lots of games, and it's up to you to find out when to turn off your computer.
Contributor Unknown

Hardball: Champs are the better base stealing team, with the first, second and eighth players in the lineup having the best chance of sliding in safe before the tag can be made. It helps if you have the batter swinging at the pitch.
Victor R. Heredia
El Paso, TX

Hardball: When you're playing an opponent (computer or human) and you catch a foul ball, the next player in the line-up will inherit the ball/strike count that existed before the player fouled out. For example, if you had a two-strike and two-ball count on a batter who fouls out, the next batter due up would come to the plate with the same two-ball, two-strike count, before ever receiving a pitch.
Victor R. Heredia
El Paso, TX

I Love Lucy: When you come home, let the cute little dog lick you in the face. When she sits on her hind legs, scratch her under the arms. She will become your friend for life.
Hub Sander
Ross Township, PA

Kung Fu: For an easy game, go to the fourth or fifth level and let the guardian kill you. The next time you play you will discover that the number of foes you will face will be greatly reduced. To get things back to normal, kill the guardian at the fourth level.
Contributor Unknown

The Last Ninja: When fighting an enemy, attack him as much as you can and then run off the screen. Continue attacking him and running off the screen until you defeat him. With practice you can defeat an enemy without losing any life power.
Doug Smith
Milton, FL

Legacy of the Ancients: When you start, go to the Thornberry exhibit and view it by using your Jade Coin. You will receive 300 gold pieces and will be teleported to the town Thornberry. There you can use your money to get some decent weapons, armor and climbing gear, and you'll still have enough to gamble some off.
Peter Liang
Ann Arbor, MI

Legacy of the Ancients: When you return the Jeweled Crown and the Sceptre to the Caretaker, he will give you Magic Ice. Magic Ice is used to freeze the River in the Castle so you can cross it and get to the second level of the Castle.
Peter Liang
Ann Arbor, MI

Legacy of the Ancients: The Tulip is on the first floor of the Castle. When you return it to the Fountain exhibit in the Museum, you will receive fifteen points in your charm.
Peter Liang
Ann Arbor, MI

Lode Runner: For the people who think *Lode Runner* is the most impossible game these pokes will come in handy:
POKE 2966,234 for unlimited lives.
POKE 2958,230 for more points at the end of the level.
Brent Archibald
Donvale, Victoria
Australia

Marble Madness: Want to increase your scores? Simply play with a friend! No, not against a friend—with a friend, as follows:

You may have noticed that when playing in one-player mode, both joysticks/trackballs can control the ball. An annoying bug, right? Wrong! Put it to your use—both of you can play the same ball, simultaneously. Be sure to have both joysticks/trackballs plugged in, and just push the 1 key or push a fire button.

Both of you can help control the ball, and best of all, if both of you can use the "turbo" option (fire button), they add enough power to knock the "steekie" backwards in his tracks! And they add enough power to whiz past the Vacuum Nozzles with no deflection at all. Scores of well over 24,000 points are easily attainable with this method, and the sixth frame is now easily reached; even the difficult fifth frame is not such a problem.
David A. Butcher & Alan Able
Cleveland, TN

Maniac Mansion: Have any player who goes into the room with the Playboy Calendar and the Miss Mummy poster use the "Hunk-o-Matic" exercise machine. Then when you go to the garage, you can pick up the garage door right away.
Omar Salinas
Taft, TX

Maniac Mansion: If you need to get out of the Dungeon, just have two men or women in there. Put one by the door on the right and the other by the upper right of the Skeleton. Have that person examine all of the wall to the upper right of the Skeleton with the WHAT IS statement, and find the loose brick. Push in the brick. Switch to the other person in the dungeon and walk through the now-open door.

Having trouble with the Man Eating Plant upstairs? Just get some of the pool water in the jar. Give it to the plant, then give it the Pepsi. Leave and return, and climb the plant! Cool, huh?

Did you ever notice that Rusty Key up there on the Chandelier in the Living Room? To get it, get the Blank Tape in the Library. (It's in the loose panel to the very right). Take it upstairs to the Tape Recorder and put it in. Get the old record on the Stereo and turn on the Recorder. Play the record on the Victrola for

a while. Stop the Recorder and get the Tape. Take it downstairs to the Living Room and play it in the Player under the Old Radio. Earth shattering, wasn't it!?
Patrick Presnell
Address Unknown

Montezuma's Revenge: To play through the whole game in slow motion, hold the space bar down.
Contributor Unknown

One-On-One: The F3 key controls the audio part of the game. To delete the sound simply press F3 until you can no longer hear the action. Do the same to return the sound to the game.
Victor R. Heredia
El Paso, TX

Phantasie III: To travel to the Plane of Darkness, instead of entering C2+ for the Plane of Light, enter C2–. You may find the Gem of Light in the Plane of Light dungeon, but the Dark Plane is more important. At the end or bottom of the Darkness Dungeon, you will be given eight choices on what to do with the wand of N. Kademus. Select #4 for Break Wand, and you will be teleported to the Nether World.
Steven Gabaris
Flushing, NY

Pirates: Using a large ship such as a Frigate or Galleon to fight another Frigate or Galleon is a wise idea, but don't use a large ship to fight a Sloop or a Pinnace. Even though you are superior in strength, their maneuverability will leave you on the horizon while you're trying to turn around.
Frozen Fire
Address Unknown

Rambo: First Blood Part II: The best way to go through the jungle is to use explosive arrows and just blow up a path to your chopper.
Michael Wherry
Viola, IL

Silent Service: Not many captains can resist a convoy of tankers and troop transports, no matter what is protecting them. If you surface far off and shoot two or three guns at the convoy, the destroyers should move in your direction. Put your stern in their face and make them follow you; let some shots go, and if that doesn't kill them all an aft torpedo or two will do the job. Then the convoy is all yours.
Frozen Fire
Address Unknown

Skate or Die: On a Downhill Race, try a 360 off the skull ramp. It also works off the porch. You could also try hopping the island at the end.
Keith Rains
Duncanville, TX

Skate or Die: On Ramp Highjump, move the joystick in circles. This is more comfortable, and works better for people who aren't very fast.
Keith Rains
Duncanville, TX

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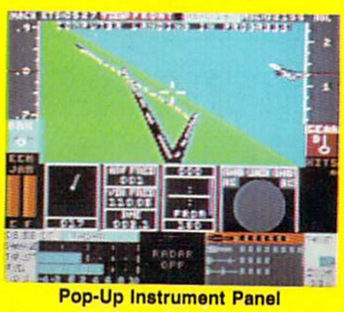
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